Vol. 1133 Number 3

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

December 17, 1991

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

December 17, 1991 Volume 1133 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1126 O.G. 2, on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987 and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed on July 1, 1991, due to a difference in the exchange rate of the U.S. dollar in relation to the German mark, and was announced in the *Official Gazette* at 1126 O. G. 76 on May 28, 1991.

International fees were changed on August 1, 1991, due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc, and were announced in the *Official Gazette* at 1128 O.G. 46, on July 23, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1320.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	490.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	119.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	150.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

June 27, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on December 13, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,790,031 through 4,791,680
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on December 11, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,486,901 through 4,488,312
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$415.00
By other than a small entity.....$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$835.00
By other than a small entity.....$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 6, 1991
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,407,021	06/249,114	10/04/83
4,407.028	06/234,254	10/04/83
4,407,033	06/332,253	10/04/83
4,407,035	06/373,412	10/04/83
4,407,037	06/296,063	10/04/83
4,407,040	06/330,180	10/04/83
4,407,043	06/224,660	10/04/83
4,407,051	06/389,666	10/04/83
4,407,053	06/324,536	10/04/83
4,407,056	06/335,669	10/04/83
4,407,062	06/276,994	10/04/83
4,407,065	06/299,473	10/04/83
4,407,075	06/326,849	10/04/83
4,407,082	06/320,939	10/04/83
4,407,089	06/248,404	10/04/83
4,407,093	06/428,422	10/04/83
4,407,111	06/296,436	10/04/83
4,407,114	06/277,016	10/04/83
4,407,116	06/303,382	10/04/83
4,407,119	06/243,020	10/04/83
4,407,126	06/322,498	10/04/83
4,407,129	06/368,085	10/04/83
4,407,132	06/330,433	10/04/83
4,407,133	06/291,794	10/04/83
4,407,134	06/323,054	10/04/83
4,407,138	06/278,944	10/04/83
4,407,149	06/430,959	10/04/83
4,407,155	06/312,004	10/04/83
4,407,162	06/358,345	10/04/83
4,407,163	06/264,130	10/04/83
4,407,164	06/394,438	10/04/83
4,407,165	06/248,746	10/04/83
4,407,178	06/304,910	10/04/83
4,407,181	06/224,114	10/04/83
4,407,185	06/351,634	10/04/83
4,407,189	06/397,547	10/04/83
4,407,191	06/305,323	10/04/83
4,407,192	06/314,189	10/04/83
4,407,199	06/292,129	10/04/83
4,407,200	06/263,308	10/04/83
4,407,203	06/262,591	10/04/83
4,407,205	06/373,582	10/04/83
4,407,213	06/438,839	10/04/83
4,407,215	06/330,559	10/04/83
4,407,219	06/283,149	10/04/83
4,407,220	06/264,184	10/04/83
4,407,221	06/218,280	10/04/83
4,407,222	06/295,067	10/04/83
4,407,227	06/323,427	10/04/83
4,407,230	06/385,097	10/04/83
4,407,232	06/356,123	10/04/83
4,407,235	06/363,581	10/04/83
4,407,243	06/294,464	10/04/83
4,407,252	06/270,639	10/04/83
4,407,257	06/331,866	10/04/83
4,407,262	06/239,681	10/04/83
4,407,270	06/270,222	10/04/83
4,407,279	06/296,954	10/04/83
4,407,283	06/312,535	10/04/83
4,407,298	06/283,716	10/04/83
4,407,313	06/236,451	10/04/83
4,407,315	06/272,911	10/04/83
4,407,317	06/244,158	10/04/83
4,407,319	06/323,973	10/04/83
4,407,324	06/234,920	10/04/83
4,407,328	06/252,533	10/04/83
4,407,333	06/276,396	10/04/83
4,407,335	06/228,952	10/04/83
4,407,356	06/241,677	10/04/83
4,407,358	06/287,071	10/04/83
4,407,359	06/285,748	10/04/83
4,407,364	06/228,996	10/04/83
4,407,365	06/297,375	10/04/83
4,407,380	06/272,394	10/04/83
4,407,381	06/375,973	10/04/83
4,407,382	06/249,715	10/04/83
4,407,383	06/313,361	10/04/83
4,407,389	06/226,030	10/04/83
4,407,392	06/298,221	10/04/83
4,407,393	06/266,623	10/04/83
4,407,399	06/230,079	10/04/83
4,407,400	06/229,398	10/04/83
4,407,401	06/231,020	10/04/83

Patent Number	Serial Number	Issue Date
4,407,404	06/280,385	10/04/83
4,407,405	06/280,386	10/04/83
4,407,414	06/416,958	10/04/83
4,407,418	06/267,786	10/04/83
4,407,420	06/289,382	10/04/83
4,407,425	06/350,754	10/04/83
4,407,434	06/259,720	10/04/83
4,407,436	06/352,126	10/04/83
4,407,442	06/324,771	10/04/83
4,407,444	06/318,310	10/04/83
4,407,449	06/315,857	10/04/83
4,407,453	06/314,996	10/04/83
4,407,455	06/369,033	10/04/83
4,407,458	06/321,635	10/04/83
4,407,459	06/307,656	10/04/83
4,407,461	06/351,891	10/04/83
4,407,471	06/217,490	10/04/83
4,407,476	06/346,527	10/04/83
4,407,488	06/437,844	10/04/83
4,407,489	06/445,769	10/04/83
4,407,499	06/269,669	10/04/83
4,407,506	06/350,999	10/04/83
4,407,507	06/280,327	10/04/83
4,407,508	06/450,339	10/04/83
4,407,518	06/455,065	10/04/83
4,407,519	06/308,268	10/04/83
4,407,520	06/255,623	10/04/83
4,407,525	06/263,373	10/04/83
4,407,533	06/307,441	10/04/83
4,407,539	06/297,094	10/04/83
4,407,540	06/291,087	10/04/83
4,407,547	06/254,602	10/04/83
4,407,548	06/320,892	10/04/83
4,407,554	06/244,512	10/04/83
4,407,557	06/283,235	10/04/83
4,407,563	06/333,535	10/04/83
4,407,576	06/337,928	10/04/83
4,407,582	06/224,627	10/04/83
4,407,592	06/238,228	10/04/83
4,407,594	06/267,929	10/04/83
4,407,597	06/271,937	10/04/83
4,407,599	06/356,039	10/04/83
4,407,600	06/305,152	10/04/83
4,407,608	06/287,526	10/04/83
4,407,613	06/341,735	10/04/83
4,407,622	06/264,614	10/04/83
4,407,624	06/290,597	10/04/83
4,407,636	06/325,972	10/04/83
4,407,645	06/282,207	10/04/83
4,407,656	06/261,993	10/04/83
4,407,657	06/262,003	10/04/83
4,407,660	06/300,338	10/04/83
4,407,661	06/327,831	10/04/83
4,407,668	06/380,817	10/04/83
4,407,673	06/346,340	10/04/83
4,407,676	06/394,785	10/04/83
4,407,684	06/258,201	10/04/83
4,407,690	06/356,718	10/04/83
4,407,699	06/320,742	10/04/83
4,407,700	06/388,338	10/04/83
4,407,710	06/311,546	10/04/83
4,407,713	06/290,426	10/04/83
4,407,717	06/444,350	10/04/83
4,407,719	06/316,725	10/04/83
4,407,722	06/387,308	10/04/83
4,407,723	06/356,035	10/04/83
4,407,738	06/333,131	10/04/83
4,407,739	06/344,020	10/04/83
4,407,752	06/403,952	10/04/83
4,407,753	06/280,266	10/04/83
4,407,754	06/357,438	10/04/83
4,407,758	06/316,597	10/04/83
4,407,770	06/359,832	10/04/83
4,407,782	06/299,267	10/04/83
4,407,783	06/408,408	10/04/83
4,407,786	06/252,662	10/04/83
4,407,789	06/321,874	10/04/83
4,407,798	06/296,301	10/04/83
4,407,802	06/306,112	10/04/83
4,407,803	06/293,767	10/04/83
4,407,806	06/323,832	10/04/83
4,407,807	06/332,568	10/04/83
4,407,814	06/330,364	10/04/83
4,407,817	06/369,713	10/04/83
4,407,818	06/304,303	10/04/83
4,407,825	06/344,175	10/04/83
4,407,843	06/295,083	10/04/83
4,407,844	06/304,100	10/04/83
4,407,845	06/389,270	10/04/83
4,407,857	06/279,182	10/04/83
4,407,864	06/307,577	10/04/83
4,407,870	06/377,588	10/04/83
4,407,875	06/270,563	10/04/83
4,407,876	06/239,493	10/04/83
4,407,878	06/242,022	10/04/83
4,407,886	06/316,445	10/04/83
4,407,891	06/323,332	10/04/83
4,407,900	06/309,782	10/04/83
4,407,915	06/320,841	10/04/83
4,407,916	06/358,263	10/04/83
4,407,938	06/369,362	10/04/83
4,407,939	06/250,331	10/04/83
4,407,941	06/355,464	10/04/83
4,407,959	06/313,666	10/04/83
4,407,968	06/412,336	10/04/83
4,407,969	06/357,024	10/04/83
4,407,978	06/437,619	10/04/83
4,407,980	06/423,802	10/04/83
4,408,000	06/327,947	10/04/83
4,408,015	06/349,946	10/04/83
4,408,019	06/272,452	10/04/83
4,408,027	06/288,887	10/04/83
4,408,044	06/338,811	10/04/83
4,408,048	06/264,714	10/04/83
4,408,057	06/451,293	10/04/83
4,408,060	06/224,416	10/04/83
4,408,071	06/262,077	10/04/83
4,408,088	06/347,524	10/04/83
4,408,090	06/227,757	10/04/83
4,408,091	06/258,905	10/04/83
4,408,097	06/259,797	10/04/83
4,408,101	06/369,137	10/04/83
4,408,102	06/257,596	10/04/83
4,408,106	06/360,474	10/04/83
4,408,107	06/276,862	10/04/83
4,408,110	06/222,975	10/04/83
4,408,112	06/273,206	10/04/83
4,408,115	06/285,497	10/04/83
4,408,123	06/230,808	10/04/83
4,408,124	06/254,097	10/04/83
4,408,125	06/282,789	10/04/83
4,408,127	06/377,950	10/04/83
4,408,140	06/326,802	10/04/83
4,408,146	06/229,793	10/04/83
4,408,147	06/358,697	10/04/83
4,408,164	06/298,373	10/04/83
4,408,166	06/388,315	10/04/83
4,408,171	06/243,607	10/04/83
4,408,173	06/315,901	10/04/83
4,408,175	06/340,416	10/04/83
4,408,202	06/326,554	10/04/83
4,408,215	06/220,844	10/04/83
4,408,220	06/229,449	10/04/83
4,408,229	06/268,497	10/04/83
4,408,230	06/280,906	10/04/83
4,408,245	06/334,819	10/04/83
4,408,251	06/282,945	10/04/83
4,408,263	06/330,477	10/04/83
4,408,265	06/254,026	10/04/83
4,408,267	06/416,704	10/04/83
4,408,270	06/284,016	10/04/83
4,408,282	06/256,372	10/04/83
4,408,284	06/227,025	10/04/83
4,408,288	06/241,232	10/04/83
4,408,291	06/270,003	10/04/83
4,408,297	06/233,533	10/04/83

Patent Number	Serial Number	Issue Date
4,408,298	06/277,982	10/04/83
4,408,312	06/303,982	10/04/83
4,408,315	06/306,454	10/04/83
4,408,316	06/293,835	10/04/83
4,408,317	06/369,204	10/04/83
4,408,320	06/295,515	10/04/83
4,408,321	06/257,183	10/04/83
4,408,334	06/243,416	10/04/83
4,408,337	06/236,631	10/04/83
4,408,338	06/336,468	10/04/83
4,408,339	06,233,995	10/04/83
4,408,341	06/320,359	10/04/83
4,408,346	06/301,660	10/04/83
4,408,354	06/223,724	10/04/83
4,697,289	06/752,249	10/06/87
4,697,294	06/778,511	10/06/87
4,697,295	06/916,797	10/06/87
4,697,302	06/846,746	10/06/87
4,697,311	06/893,653	10/06/87
4,697,322	06/543,081	10/06/87
4,697,353	06/878,177	10/06/87
4,697,360	06/869,515	10/06/87
4,697,362	06/814,763	10/06/87
4,697,365	06/779,905	10/06/87
4,697,366	06/747,970	10/06/87
4,697,367	06/863,946	10/06/87
4,697,368	06/928,568	10/06/87
4,697,372	06/807,252	10/06/87
4,697,373	06/716,747	10/06/87
4,697,374	06/915,551	10/06/87
4,697,377	06/918,118	10/06/87
4,697,378	06/783,594	10/06/87
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4,697,382	06/917,255	10/06/87
4,697,390	07/007,571	10/06/87
4,697,391	06/811,749	10/06/87
4,697,394	06/892,841	10/06/87
4,697,398	06/826,928	10/06/87
4,697,399	06/819,614	10/06/87
4,697,405	06/813,053	10/06/87
4,697,406	06/837,141	10/06/87
4,697,410	06/861,558	10/06/87
4,697,411	06/878,973	10/06/87
4,697,420	06/873,980	10/06/87
4,697,424	06/746,469	10/06/87
4,697,427	06/732,874	10/06/87
4,697,438	06/906,915	10/06/87
4,697,441	06/928,308	10/06/87
4,697,454	06/801,967	10/06/87
4,697,457	06/835,678	10/06/87
4,697,461	06/864,617	10/06/87
4,697,477	06/630,874	10/06/87
4,697,483	06/808,179	10/06/87
4,697,486	06/693,174	10/06/87
4,697,488	06/708,018	10/06/87
4,697,491	06/875,018	10/06/87
4,697,493	06/910,236	10/06/87
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4,697,497	06/805,705	10/06/87
4,697,501	06/822,570	10/06/87
4,697,507	06/814,915	10/06/87
4,697,522	06/865,545	10/06/87
4,697,523	06/813,062	10/06/87
4,697,524	06/819,290	10/06/87
4,697,525	06/917,634	10/06/87
4,697,529	06/867,607	10/06/87
4,697,534	06/755,788	10/06/87
4,697,535	06/891,659	10/06/87
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4,697,539	06/878,083	10/06/87
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4,697,556	06/799,814	10/06/87
4,697,568	06/826,069	10/06/87
4,697,570	06/867,334	10/06/87
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4,697,645	06/820,026	10/06/87
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4,697,652	06/909,273	10/06/87
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4,697,656	06/810,384	10/06/87
4,697,663	06/775,509	10/06/87
4,697,668	06/818,782	10/06/87
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4,697,674	06/745,229	10/06/87
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4,697,683	06/739,373	10/06/87
4,697,684	06/932,008	10/06/87
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4,697,766	06/821,152	10/06/87
4,697,769	06/603,097	10/06/87
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4,697,780	06/920,741	10/06/87
4,697,786	06/883,448	10/06/87
4,697,787	06/809,902	10/06/87
4,697,789	06/901,403	10/06/87
4,697,800	06/900,536	10/06/87
4,697,812	06/806,489	10/06/87
4,697,819	06/869,308	10/06/87
4,697,827	06/912,470	10/06/87
4,697,832	06/830,416	10/06/87
4,697,834	06/260,326	10/06/87
4,697,835	06/358,590	10/06/87
4,697,836	06/891,640	10/06/87
4,697,837	06/820,085	10/06/87
4,697,838	06/742,924	10/06/87
4,697,839	06/935,713	10/06/87
4,697,844	06/749,658	10/06/87
4,697,845	06/762,132	10/06/87
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4,697,849	07/000,412	10/06/87
4,697,861	06/886,943	10/06/87
4,697,866	06/660,775	10/06/87
4,697,870	06/460,762	10/06/87
4,697,872	06/574,094	10/06/87
4,697,874	06/808,806	10/06/87
4,697,880	06/721,034	10/06/87
4,697,885	06/898,776	10/06/87
4,697,890	06/783,773	10/06/87
4,697,908	06/706,505	10/06/87
4,697,919	06/935,875	10/06/87
4,697,921	06/654,018	10/06/87
4,697,922	06/846,427	10/06/87
4,697,930	06/902,003	10/06/87
4,697,940	06/853,028	10/06/87
4,697,945	06/797,743	10/06/87
4,697,947	06/868,006	10/06/87
4,697,950	06/871,083	10/06/87
4,697,952	06/834,544	10/06/87

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4,697,993	06/640,082	10/06/87
4,697,996	06/864,860	10/06/87
4,698,006	06/846,048	10/06/87
4,698,012	06/778,411	10/06/87
4,698,014	06/812,184	10/06/87
4,698,016	06/829,130	10/06/87
4,698,018	06/763,141	10/06/87
4,698,021	06/802,987	10/06/87
4,698,023	06/857,975	10/06/87
4,698,029	06/893,052	10/06/87
4,698,032	06/616,758	10/06/87
4,698,034	06/753,640	10/06/87
4,698,038	06/661,690	10/06/87
4,698,040	06/921,308	10/06/87
4,698,042	06/896,819	10/06/87
4,698,043	06/861,358	10/06/87
4,698,044	06/852,288	10/06/87
4,698,048	06/848,228	10/06/87
4,698,051	06/885,150	10/06/87
4,698,054	06/858,708	10/06/87
4,698,055	06/934,158	10/06/87
4,698,061	06/854,685	10/06/87
4,698,066	06/841,901	10/06/87
4,698,068	06/778,409	10/06/87
4,698,072	06/865,718	10/06/87
4,698,073	06/832,791	10/06/87
4,698,075	06/871,458	10/06/87
4,698,078	06/906,552	10/06/87
4,698,090	06/771,554	10/06/87
4,698,091	06/752,475	10/06/87
4,698,094	06/725,537	10/06/87
4,698,097	06/508,520	10/06/87
4,698,112	06/850,523	10/06/87
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4,698,150	06/778,395	10/06/87
4,698,156	06/847,753	10/06/87
4,698,162	06/806,151	10/06/87
4,698,163	06/796,821	10/06/87
4,698,166	06/823,226	10/06/87
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4,698,199	06/713,632	10/06/87
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4,698,233	06/872,278	10/06/87
4,698,250	06/925,478	10/06/87
4,698,258	06/865,673	10/06/87
4,698,259	06/767,898	10/06/87
4,698,269	06/861,004	10/06/87
4,698,274	06/807,794	10/06/87
4,698,278	06/921,723	10/06/87
4,698,284	06/791,256	10/06/87
4,698,289	06/833,992	10/06/87
4,698,305	06/652,487	10/06/87
4,698,310	06/432,920	10/06/87
4,698,313	06/827,078	10/06/87
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4,698,331	06/815,097	10/06/87
4,698,333	06/546,687	10/06/87
4,698,335	06/655,227	10/06/87
4,698,336	06/821,914	10/06/87
4,698,337	06/912,212	10/06/87
4,698,342	06/830,717	10/06/87
4,698,344	06/800,485	10/06/87
4,698,350	06/651,121	10/06/87
4,698,351	06/899,453	10/06/87
4,698,358	06/896,562	10/06/87
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4,698,389	06/741,913	10/06/87
4,698,409	06/858,979	10/06/87
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4,698,419	06/835,114	10/06/87
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4,698,459	06/916,526	10/06/87
4,698,462	06/819,820	10/06/87
4,698,479	06/925,503	10/06/87
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4,698,485	06/762,869	10/06/87
4,698,498	06/856,706	10/06/87
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4,698,539	06/309,373	10/06/87
4,698,547	06/830,151	10/06/87
4,698,551	06/841,767	10/06/87
4,698,555	06/939,584	10/06/87
4,698,560	06/801,490	10/06/87
4,698,564	06/742,416	10/06/87
4,698,582	06/889,642	10/06/87
4,698,595	06/735,006	10/06/87
4,698,603	06/859,486	10/06/87
4,698,609	06/858,210	10/06/87
4,698,615	06/832,090	10/06/87
4,698,620	06/793,584	10/06/87
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4,698,671	06/737,869	10/06/87
4,698,673	06/787,052	10/06/87
4,698,684	06/788,973	10/06/87
4,698,702	06/739,853	10/06/87
4,698,706	06/887,655	10/06/87
4,698,709	07/014,187	10/06/87
4,698,710	06/759,605	10/06/87
4,698,725	06/842,642	10/06/87
4,698,731	06/781,700	10/06/87
4,698,732	06/796,964	10/06/87
4,698,741	06/757,540	10/06/87
4,698,758	06/715,827	10/06/87
4,698,765	06/757,816	10/06/87
4,698,779	06/728,718	10/06/87
4,698,808	06/806,076	10/06/87
4,698,813	06/728,048	10/06/87
4,698,818	06/891,943	10/06/87
4,698,825	06/757,697	10/06/87
4,698,832	06/638,487	10/06/87
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Reissue Applications Filed

Notice under 37 CFR 1.11 (b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21 (b)).

4,018,562, Re. S.N. 07/708,810, Filed May 31, 1991, Cl. 436, CHEMILUMINESCENT NITROGEN DETECTION APPARATUS AND METHOD, Robert E. Parks, Owner of Record: *Inventor*, Attorney or Agent: Charles L. Gholz, Ex. Gp.: 181

4,707,095, Re. S.N. 07/785,214, Filed Oct. 28, 1991, Cl. 354, FILM REWINDER, Yoshiyuki Nakano, et. al., Owner of Record: *Nippon Kogaku K. K., Tokyo, Japan*, Attorney or Agent: Mitchell W. Shapiro, Ex. Gp.: 211

4,788,724, Re. S.N. 07/784,070, Filed Oct. 30, 1991, Cl. 002, MOTORCYCLE HELMET MICROPHONE MOUNT AND PLUG MOUNT, John J. Lazzaroni, Owner of Record: *Inventor*, Attorney or Agent: Janelle Founee Raupy, Ex. Gp.: 247

4,827,941, Re. S.N. 07/697,780, Filed May 5, 1991, Cl. 128/657, EXTENDABLE GUIDEWIRE FOR CARDIOVASCU-

LAR PROCEDURES, Charles S. Taylor, et. al., Owner of Record: *Advanced Cardiovascular Systems, Inc.*, Attorney or Agent: Edward J. Lynch, Ex. Gp.: 335

4,884,363, Re. S.N. 07/783,611, Filed Oct. 28, 1991, Cl. 47/040.5, TREE STAND, Hugh M. Sofy, Owner of Record: *Inventor*, Attorney or Agent: Harold W. Milton, Jr., Ex. Gp.: 354

4,884,445, Re. S.N. 07/575,920, Filed Aug. 31, 1990, Cl. 268/73, STRENGTH ANALYZER APPARATUS AND METHOD OF USING SAME, Armin M. Sadoff, et. al., Owner of Record: *Inventor*, Attorney or Agent: John M. May, Ex. Gp.: 268

4,989,686, Re. S.N. 07/721,089, Filed June 24, 1991, Cl. 180/197, A SYSTEM FOR CONTROLLING TORQUE TRANSMISSION IN A FOUR WHEEL DRIVE VEHICLE, Alan L. Miller, et. al., Owner of Record: *Borg-Warner Automotive, Inc., Troy, Michigan*, Attorney or Agent: John C. Evans, Ex. Gp.: 316

Requests for Reexamination Filed

Notice under 37 CFR 1.11 (c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19 (a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,404,469, Reexam No. 90/002,506, Requested Nov. 12, 1991, Cl. 364/900, DOCUMENT PROCESSING SYSTEM, Leonard J. Numley, et. al., Owner of Record: *Recognition Equipment Inc., Irving, Tex.*, Attorney or Agent: Ross, Howison, Clapp & Korn, Richardson, Tex., Ex. Gp.: 237, Requester: Owner

4,589,876, Reexam No. 90/002,507, Requested Nov. 12, 1991, Cl. 604/385.1, SANITARY NAPKIN, Kees J. Van Tilburg, Owner of Record: *The Proctor & Gamble Co., Cincinnati, Ohio*, Attorney or Agent: Monte D. Witte, Cincinnati, Ohio, Ex. Gp.: 338, Requester: Anonymous; Wegner, Cantor, Mueller & Player, Washington, DC

4,741,173, Reexam No. 90/002,510, Requested Nov. 14, 1991, Cl. 062/298, AUGER TYPE ICEMAKER, Charles G. Neumann, Owner of Record: *Society National Bank, Cleveland, Ohio*, Attorney or Agent: Shenier & O'Conner, New York, N.Y., Ex. Gp.: 344, Requester: Wilshire Partners, Cleveland, Ohio

4,760,307, Reexam No. 90/002,508, Requested Nov. 12, 1991, Cl. 313/371, ANTI-VEILING-GLARE GLASS INPUT WINDOW FOR AN OPTICAL DEVICE AND METHOD FOR MANUFACTURING SUCH WINDOW, Jonathan R. Howorth, Owner of Record: *B. V. Optische Industrie De Oude Delft, Delft, Netherlands*, Attorney or Agent: Marn & Jangarathis, Parsippany, N.J., Ex. Gp.: 264, Requester: Dennis E. Stenzel, Portland, Oreg.

4,859,975, Reexam No. 90/002,505, Requested Nov. 12, 1991, Cl. 335/230, ELECTROMAGNETIC ACTUATOR, Tokio Uetsuhara, Owner of Record: *Mitsubishi Materials Corp. (A. K. A. Mitsubishi Mining & Cement, Tokyo, Japan & Iwasaki Electric Co. Ltd., Kyoto, Japan)*, Attorney or Agent: Charles A. Muserlian, Bierman & Muserlian, New York, N.Y., Ex. Gp.: 213, Requester: Owner

4,906,211, Reexam No. 90/002,509, Requested Nov. 12, 1991, Cl. 439/851, CONNECTOR FOR AIRCRAFT-TO-GROUND MAINTENANCE ELECTRICAL CONNECTION, Robert Bell, et. al., Owner of Record: *Wyle Laboratories, El Segundo, Calif.*, Attorney or Agent: Leon D. Rosen, Freilich, Hornbaker & Rosen, Los Angeles, Calif., Ex. Gp.: 322, Requester: Owner

Errata

All reference to Patent No. 5,049,660 to Stephen B. Storrs, et. al. for 'METHOD FOR PURIFYING SOMATOTROPIN MONOMERS' appearing in the *Official Gazette* of Sept. 17, 1991 should be deleted since no patent was granted."

All reference to Patent No. 5,057,872 to Hiromitsu Saijo, Osaka, Japan; et. al. for 'DEVELOPER SUPPLYING DEVICE FOR SUPPLYING APPROXIMATELY CONSTANT AMOUNTS OF DEVELOPER' appearing in the *Official Gazette* of Oct. 15, 1991 should be deleted since no patent was granted."

All reference to Patent No. 5,057,951 to Steve S. Eckerd, Oklahoma City, Okla. for 'BREATHER VENT ASSEMBLY FORMED IN A SEALED DISK DRIVE HOUSING' appearing in the *Official Gazette* of Oct. 15, 1991 should be deleted since no patent was granted."

All reference to Patent No. 5,059,563 to Bijan Khazai, Midland, Mi; et. al. for 'SYNTHESIS OF REFRACTORY METAL BORIDE POWERS OF PREDETERMINED PARTICLE SIZE' appearing in the *Official Gazette* of Oct. 22, 1991 should be deleted since no patent was granted."

All reference to Patent No. 5,060,715 to Jacques Barbe, Saint-Etienne, France for 'PROCESS AND ASSEMBLY FOR FEEDING MOLTEN METAL TO THE INGOT MOLD OF AN INSTALLATION FOR THE CONTINUOUS CASTING OF THIN COGS' appearing in the *Official Gazette* of Oct. 29, 1991 should be deleted since no patent was granted."

Class 395 Established

Class 395, Information Processing System Organization, has been established and replaces class 364, subclass 200 (General Purpose Programmable Digital Computer System), subclasses 513-513.5 (Artificial Intelligence), subclass 518-523 (Control of Data Presentation), and subclass 900 (Miscellaneous Digital Processing Systems). On June 26, 1990, examiners and classifiers met with public searchers to discuss the preliminary schedule. After consideration of comments received in that meeting, a proposed schedule was generated. The proposed hierarchial schedule of primary subclasses with their associated definitions was published in the *Official Gazette*, Vol. 1119, No. 3 on Oct. 16, 1990. Following evaluation of public comments, the final schedule for class 395 was created. The final Hierarchical schedule of primary subclasses and associated definitions are shown below.

NOTE: The CASPIR terms can be electronically searched on the APS Messenger system by using Class 364, Digest 1 (General Purpose Programmable Digital Computer Systems) and class 364, Digest 2 (Miscellaneous Digital Data Processing Systems).

Class 395 was established as of Nov. 5, 1991, and assigned to Group 2300 Art Units as follows:

Subclass	*Art Unit*	*Search Room Location*
1	2308	CP4-9C26
2	2311	CP4-8B13
3, 10-13, 20-27 50-55, 60-68, 75-77, 80-99	2308	CP4-9C26

Subclass	*Art Unit*	*Search Room Location*
100-166	2301	CP4-8B13
200	2307	CP4-9B31
250, 275, 325	2308	CP4-9B31
375	2302	CP4-9B31
400, 425	2312	CP4-9B31
500	2302	CP4-9B31
550	2309	CP4-9B31
575	2306	CP4-9B31
600	2307	CP4-9B31
650, 700	2307	CP4-9B31
725, 750, 775	2308	CP4-9B31
800	2302	CP4-9B31
CROSS-REFERENCE ART COLLECTIONS 900-934	2308	CP4-9B26

The major new categories and class definitions follow:

1 ARTIFICIAL INTELLIGENCE
100 DATA PRESENTATION/COMPUTER GRAPHICS (e.g., IMAGE, GRAPHICS, TEXT)
200 TRANSMISSION OF INFORMATION AMONG MULTIPLE COMPUTER SYSTEMS
250 BUFFERING FUNCTIONS
275 I/O PROCESSING
325 SYSTEM INTERCONNECTIONS
375 INSTRUCTION PROCESSING
400 STORAGE ADDRESS FORMATION
425 STORAGE ACCESSING AND CONTROL
500 COMPATIBILITY, SIMULATION, OR EMULATION OF SYSTEM COMPONENTS
550 TIMING
575 RELIABILITY
600 DATABASE OR FILE MANAGEMENT SYSTEM
650 PROCESSING (TASK) MANAGEMENT
700 SYSTEM UTILITIES
725 ACCESS CONTROL PROCESSING
750 POWER CONTROL
775 INTERNAL CONTROL
800 PROCESSING ARCHITECTURE

Definition of the class

I. GENERAL STATEMENT OF THE CLASS SUBJECT MATTER

(1) This is the generic class for digital processing systems and corresponding methods for performing information processing functions and methods for controlling operation of such processing systems.
(2) This class also provides for artificial intelligence, i.e., systems or methods which have the capacity to perform one or more of the functions or recognition, speech signal processing of knowledge processing (i.e, propositional logic, reasoning, learning self-improvement), complex operations of manipulator (e.g. robot control, or inexact reasoning (e.g., fuzzy logic).
(3) This class also provides for methods or apparatus for processing data for (1) static presentation (hard copy) or (2) display, wherein the processing of data for display includes the creation or manipulation of graphic objects (e.g., artificial image) or text by a computer prior to use with or in a specific display system.

1. ARTIFICIAL INTELLIGENCE:

Subject matter under the class definition wherein the system or method has the capacity to perform one or more of the functions of recognition, speech signal processing, knowledge processing (i.e., propositional logic, reasoning, learning, self-improvement), complex operations of a manipulator (e.g., robot control), or inexact reasoning (e.g., fuzzy logic).

100. DATA PRESENTATION/COMPUTER GRAPHICS (e.g., IMAGE GRAPHICS, TEXT):

Subject matter under the class definition comprising methods or apparatus for processing data for (1) static presentation (hard copy) or (2) display, wherein the processing of data for display includes the creation or manipulation of graphic objects (e.g., artificial images) or text by a computer prior to use with or in a specific display system.

200. TRANSMISSION OF INFORMATION AMONG MULTIPLE COMPUTER SYSTEMS:

Subject matter under the class definition comprising apparatus or processes for transmitting information (e.g., address, data, control, and status) between multiple computer systems via a communication medium and for performing significant processing in which there is a change in the content of the data before or after the transmission.

250. BUFFERING FUNCTIONS:

Subject matter under the class definition including means or steps, involving buffering structure or operations, which change the speed of information exchange among any combination of processing component(s), memory component(s) and I/O component(s).

275. I/O PROCESSING:

Subject matter under the class definition including means or steps for the control of input/output components or functions.

325. SYSTEM INTERCONNECTIONS:

Subject matter under the class definition comprising details of means or steps relating to interconnections or communication between component(s) connected to an interconnection medium with a *single* digital processing system dealing with digital information processing.

375. INSTRUCTION PROCESSING:

Subject matter under the class definition including details of instruction prefetching, fetching, buffering, decoding, pipelining, and execution.

400. STORAGE ADDRESS FORMATION:

Subject matter under the class definition including means or methods for forming or manipulating memory addresses.

425. STORAGE ACCESSING AND CONTROL:

Subject matter under the class definition including the control of access to memory components and the accessing of the memory components.

500. COMPATIBILITY, SIMULATION, OR EMULATION OF SYSTEM COMPONENTS:

Subject matter under the class definition including details of means or steps by which any one of a combination of processing component(s), memory component(s) and I/O component(s) is made compatible with at least one other processing component, or made to simulate or emulate another processing component.

550. TIMING:

Subject matter under the class definition relating to the control or regulation of any one or combination of processing components, memory components and I/O components according to a periodic sequence of timing pulses.

575. RELIABILITY:

Subject matter under the class definition including details of means or steps for diagnostic testing or monitoring of a digital processing system for reliability purposes.

600. DATABASE OR FILE MANAGEMENT SYSTEM:

Subject matter under the class definition relating to the addressing, retrieval or manipulation of information contained within the database of a digital processing system.

650. PROCESSING (TASK) MANAGEMENT:

Subject matter under the class definition relating to the control of operations of a plurality of cooperating processing components or plurality of a processes.

700. SYSTEM UTILITIES:

Subject matter under the class definition relating to the functions performed by an operating system (i.e., software for controlling computer operation)

725. ACCESS CONTROL PROCESSING:

Subject matter under the class definition including steps or means for regulating availability of a digital processing system resource.

750. POWER CONTROL:

Subject matter under the class definition including details of steps or means for modifying the amount of power used by a computer system or the sytem response to available power.

775. INTERNAL CONTROL:

Subject matter under the class definition including details of steps or means for controlling the interaction of elements within a processing component.

800. PROCESSING ARCHITECTURE:

Subject matter under the class definition which includes digital processing system(s) having any combination or interconnection of processing component(s), memory component(s), or I/O component(s) not provided for above.

The complete schedule for definitions for class 395 can be ordered from:

Editorial Division, OCS
Patent and Trademark Office
Crystal Mall 2, Room 309
Washington, DC 20231
(703) 305-6101

Classification Order No. 1377, effective date Nov. 5, 1991, should be requested when placing an order. The cost for this Order is $40.00 which may be paid by charge to a deposit account or by a check payable to the Commissioner of Patents and Trademarks.

Nov. 7, 1991

EDWARD J. EARLS
Director of Classification Operations

PATENT NOTICES

Certificates of Correction For Week of December 17, 1991

D. 303,446	4,896,630	4,928,755	4,943,129
D. 307,906	4,897,461	4,928,937	4,944,215
D. 310,355	4,899,508	4,928,961	4,944,327
PP. 7,082	4,900,627	4,929,014	4,944,395
4,682,923	4,900,823	4,930,209	4,944,620
4,723,438	4,902,416	4,930,472	4,945,079
4,728,515	4,905,076	4,930,658	4,946,207
4,730,309	4,905,677	4,931,225	4,946,587
4,752,521	4,909,663	4,931,250	4,947,539
4,756,846	4,909,802	4,931,301	4,947,742
4,775,752	4,911,853	4,931,769	4,948,668
4,777,351	4,912,361	4,931,967	4,949,248
4,784,974	4,913,143	4,933,101	4,950,364
4,798,203	4,915,928	4,933,122	4,950,371
4,806,471	4,916,078	4,933,985	4,950,583
4,807,775	4,916,322	4,934,151	4,951,914
4,818,454	4,916,768	4,934,249	4,952,503
4,818,816	4,916,880	4,934,399	4,954,098
4,822,811	4,916,909	4,934,411	4,954,187
4,834,501	4,917,412	4,934,494	4,954,193
4,834,596	4,917,697	4,934,663	4,954,354
4,836,724	4,917,756	4,934,696	4,954,491
4,851,735	4,919,155	4,934,791	4,954,595
4,853,725	4,920,623	4,935,125	4,954,751
4,859,318	4,921,920	4,935,260	4,954,966
4,859,856	4,922,349	4,935,363	4,954,973
4,860,243	4,922,473	4,935,382	4,955,129
4,861,577	4,922,586	4,936,268	4,956,093
4,863,760	4,923,175	4,936,305	4,956,115
4,866,366	4,923,564	4,936,422	4,956,646
4,867,139	4,923,689	4,936,496	4,956,951
4,867,905	4,924,409	4,937,009	4,958,435
4,868,684	4,925,400	4,937,011	4,985,491
4,871,946	4,925,833	4,937,074	4,985,981
4,874,748	4,926,071	4,937,278	5,002,396
4,878,499	4,926,084	4,937,318	5,022,116
4,880,252	4,926,149	4,937,622	5,033,308
4,880,779	4,926,165	4,937,643	5,035,661
4,889,210	4,926,420	4,938,069	5,039,455
4,889,734	4,926,545	4,938,770	5,043,398
4,893,286	4,926,961	4,938,832	5,047,399
4,894,626	4,927,168	4,938,903	5,050,736
4,895,330	4,927,496	4,938,970	5,057,159
4,895,719	4,927,664	4,939,568	
4,895,839	4,927,707	4,943,046	

Disclaimers

4,355,974—*Eui-Wan Lee*, Eggertsville, N.Y. WAFER BOAT. Patent dated Oct. 26, 1982. Disclaimer filed Nov. 13, 1989, by the assignee, ASQ Boats, Inc.

Hereby enters this disclaimer to claims 2-10 of said patent.

4,873,986—*William D. Wallace*, Salt Lake City, Utah. DISPOSABLE APPARATUS FOR MONITORING INTRAUTERINE PRESSURE AND FETAL HEART RATE, Patent dated Oct. 17, 1989. Disclaimer filed Oct. 28, 1991, by the assignee, Utah Medical Products.

Hereby enters this disclaimer to claims 1, 2, 4-6, 9, 13, 14, 20-22, 24, 26, 28, 29, 33, 34, and 39-41 of said patent.

4,928,994—*Fritz Buchner*, Mannheim, Fed. Rep. of Germany. MOTOR VEHICLE WATER AND MUD SPLASH GUARD. Patent dated May 29, 1990. Disclaimer filed Sept. 20, 1991, by inventor.

The term of this patent subsequent to July 29, 2004, has been disclaimed.

4,963,358—*Tomoyuki Tajima*, Ichikawa, Japan. AGENT FOR INHIBITING PROLIFERATION OF HUMAN MALIGNANT TUMOR CELLS. Patent dated Oct. 16, 1990. Disclaimer filed May 21, 1991, by the assignee, Koken Ltd.

The term of this patent subsequent to March 7, 2006, has been disclaimed.

5,039,129—*Charles Balmer*, Manitoba, Canada. VEHICLE FOR AGRICULTURAL USE. Patent dated Aug. 13, 1991. Disclaimer filed Sept. 27, 1991, by the inventor.

Hereby enters this disclaimer to claims 23 and 24 of said patent.

Disclaimers and Dedication

4,562,742—*Robert L. Bell*, Chatsworth, Calif. CAPACITIVE PRESSURE TRANSDUCER. Patent dated Jan. 7, 1986. Disclaimer and Dedication filed Sept. 6, 1991, by the assignee, Bell Microcomponents, Inc.

Hereby disclaims and dedicate to the Public the remaining term of said patent.

4,670,733—*Robert L. Bell*, Agoura Hills, Calif. DIFFERENTIAL PRESSURE TRANSDUCER. Patent dated June 2, 1987. Disclaimer and Dedication filed Sept. 6, 1991, by the assignee, Bell Microsensors, Inc.

Hereby disclaims and dedicate to the Public the remaining term of said patent.

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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Washington, D.C. 20231

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Box 5	"No Fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
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Box 13	Mail for the Employee and Labor Relations Division.
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Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 16	Deposit Account Replenishment Checks
Box 171	Vacancy Announcement Applications.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box DAC	Petitions to revive, petitions to accept late payment of fees, petitions to defer issue, and petitions to withdraw an application from issue.
Box Assignment	All assignment documents except those filed with new applications.
Box DD	Mail related to Disclosure Documents.
Box EEO	Mail for the Office of Equal Employment Programs.
Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62)
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
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Box Non-Fee-Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline
Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Requests for Reexamination for *original* request papers *only*.
Box Sequence	Submission of diskette for biotechnical application.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7010
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 654-0069
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 806-7252
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
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	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
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Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5659
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	West Lafayette: Purdue University Libraries	(317) 494-2873
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kansas	Wichita: Ablah Library, Wichita State University	(316) 689-3155
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 405-9157
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Mississippi	Jackson: Mississippi Library Commission	Not Yet Operational
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(908) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 515-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	(701) 777-4888
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138

Reference Collections of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

State	*Name of Library*	*Telephone Contact*
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 495-4500
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Assistant Commissioner
STEPHEN G. KUNIN, Deputy Assistant Commissioner

PATENT EXAMINING GROUPS	Phone Number Area Code 703	New Case Date*
CHEMICAL EXAMINING GROUPS		
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110 — D. E. TALBERT, Director	308-0661	7/29/90
ORGANIC CHEMISTRY, GROUP 120 — JOHN F. TERAPANE, JR., Director	308-1235	3/29/91
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130 — BARRY S. RICHMAN, Director	308-0651	2/1/91
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150 — J. O. THOMAS, Director	308-2351	7/6/90
BIOTECHNOLOGY, GROUP 180 — EDWARD E. KUBASIEWICZ, Director	308-0196	6/2/90
ELECTRICAL EXAMINING GROUPS		
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210 — D. G. KELLY, Director	308-1782	4/17/90
SPECIAL LAWS ADMINISTRATION, GROUP 220 — ROBERT E. GARRETT, Director	308-0511	3/24/90
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230 — GERALD GOLDBERG, Director	308-0754	8/15/89
PACKAGES, CLEANING, TEXTILES AND GEOMETRICAL INSTRUMENTS GROUP 240 — CARLTON CROYLE, Director	308-0771	9/15/90
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250 — JOSEPH J. ROLLA, Director	308-0956	12/1/90
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 — BOBBY R. GRAY, Director	308-0962	6/22/90
DESIGN, GROUP 290 — ROBERT E. GARRETT, Director	308-0511	2/20/89
MECHANICAL EXAMINING GROUPS		
HANDLING AND TRANSPORTATION MEDIA, GROUP 310 — F. R. SCHMIDT, Director	308-1113	1/22/91
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320 — N. GODICI, Director	308-1148	1/29/91
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330 — J. J. LOVE, Director	308-0858	10/1/90
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340 — JOHN KITTLE, Director	308-0861	12/7/90
GENERAL CONSTRUCTION, PETROLEUM AND MINING ENGINEERING, GROUP 350 — A. L. SMITH, Director	308-0651	10/1/90

*A communication from the examiner should have been received in most applications filed prior to this date.

Expiration of Patents: The patents within the range of numbers indicated below expire during November 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151

Patents ..... Numbers 3,845,504 to 3,851,335 inclusive
Plant Patents ..... 3,644 to 3,659

NOTICE OF FINAL RULEMAKING
PATENT AND TRADEMARK FEE REVISIONS

The Patent and Trademark Office is amending its rules of practice in patent and trademark cases, Parts 1 and 2 of Title 37, Code of Federal Regulations, to adjust patent and trademark fee amounts.

Public Law 102-204, which was enacted on December 10, 1991, waives the normal 30 day notice period and allows fees to become effective in fiscal year 1992 on or after one day after publication of a notice in the *Federal Register*. A notice was published on Friday, December 13, 1991 at 56 FR Part III. The effective date for the new fee amounts is Monday, December 16, 1991.

Any fee amount that is paid on or after December 16, 1991 is subject to the new fee schedule.

Your attention is drawn to the following major changes in the fee schedule:

- The legislation established comparable maintenance fee amounts for all patents based on applications filed on or after December 12, 1980. All first stage maintenance fees are now $900 for a large entity and $450 for a small entity; second stage maintenance fees are now $1,810 for a large entity and $905 for a small entity; and third stage maintenance fees are now $2,730 for a large entity, and $1,365 for a small entity.

- The small entity provision is continued and made applicable to all maintenance fee payments.

- The trademark application filing fee was increased to $200. Several trademark service fees have been adjusted, but all other trademark processing fees remain unchanged.

If you have any questions or comments, or would like to have a copy of the *Federal Register* notice, please contact the Office of Long-Range Planning and Evaluation by phone at 703-305-8510 or by fax at 703-305-8436.

Bradford R. Huther
Assistant Commissioner
for Finance and Planning

U. S. PATENT AND TRADEMARK OFFICE

Effective December 16, 1991

The U. S. Patent and Trademark Office has amended its rules of practice in patent and trademark cases, Parts 1 and 2 of Title 37, Code of Federal Regulations to adjust patent and trademark fee amounts.

Any fee payment due and paid on or after December 16, 1991, must be paid in the revised amount. The date of mailing indicated on a proper Certificate of Mailing under either 37 CFR 1.8 or 37 CFR 1.10 will be considered to be the date of receipt and payment in the Office.

As this fee sheet is a summary and the content of rules also may be changing, you should refer to the notice published in the Federal Register on December 13, 1991 at 56 FR Part III. See also Official Gazette of December 17, 1991.

The fees which are subject to reduction for small entities who have established status (37 CFR 1.27) are shown in a separate column.

For additional information, please contact the PTO Public Service Center at (703) 305-HELP.

PATENT FEES

Fee Code	37 CFR	Description	Fee	Small Entity Fee if applicable
Filing Fees				
101 / 201	1.16(a)	Basic filing fee - utility	690.00	345.00
102 / 202	1.16(b)	Independent claims in excess of three	72.00	36.00
103 / 203	1.16(c)	Claims in excess of twenty	20.00	10.00
104 / 204	1.16(d)	Multiple dependent claim	220.00	110.00
105 / 205	1.16(e)	Surcharge- Late filing fee or oath or declaration.	130.00	65.00
106 / 206	1.16(f)	Design filing fee	280.00	140.00
107 / 207	1.16(g)	Plant filing fee	460.00	230.00
108 / 208	1.16(h)	Reissue filing fee	690.00	345.00
109 / 209	1.16(i)	Reissue independent claims over original patent	72.00	36.00
110 / 210	1.16(j)	Reissue claims in excess of 20 and over original patent	20.00	10.00
139	1.17(k)	Non-English specification	130.00	
Extension Fees				
115 / 215	1.17(a)	Extension for response within first month	110.00	55.00
116 / 216	1.17(b)	Extension for response within second month	350.00	175.00
117 / 217	1.17(c)	Extension for response within third month	810.00	405.00
118 / 218	1.17(d)	Extension for response within fourth month	1,280.00	640.00
Appeals/Interference Fees				
119 / 219	1.17(e)	Notice of appeal	260.00	130.00
120 / 220	1.17(f)	Filing a brief in support of an appeal	260.00	130.00
121 / 221	1.17(g)	Request for oral hearing	220.00	110.00
Issue Fees				
142 / 242	1.18(a)	Utility issue fee	1,130.00	565.00
143 / 243	1.18(b)	Design issue fee	400.00	200.00
144 / 244	1.18(c)	Plant issue fee	570.00	285.00
Miscellaneous Fees				
111	1.20(j)	Extension of term of patent	1000.00	
112	1.17(n)	Requesting publication of SIR - Prior to examiner's action	790.00*	
113	1.17(o)	Requesting publication of SIR - After examiner's action	1,580.00*	
145	1.20(a)	Certificate of correction	70.00	
147	1.20(c)	For filing a request for reexamination	2,180.00	
148 / 248	1.20(d)	Statutory Disclaimer	110.00	55.00

**Reduced by Basic Filing Fee Paid*

Fee Code	37 CFR	Description	Fee	Small Entity Fee if applicable
Patent Petition Fees				
122		Petitions to the Commissioner, unless otherwise specified	130.00	
138	1.17(j)	Petition to institute a public use proceeding	1,310.00	
140 / 240	1.17(l)	Petition to revive unavoidably abandoned application	110.00 /	55.00
141 / 241	1.17(m)	Petition to revive unintentionally abandoned application	1,130.00 /	565.00
Maintenance Fees : Applications Filed on or after December 12, 1980				
183 / 283	1.20(e)	Due at 3.5 years	900.00 /	450.00
184 / 284	1.20(f)	Due at 7.5 years	1,810.00 /	905.00
185 / 285	1.20(g)	Due at 11.5 years	2,730.00 /	1,365.00
186 / 286	1.20(h)	Surcharge - Late payment within 6 months.	130.00 /	65.00
187	1.20(i)	Surcharge after expiration	600.00	
PCT Fees - National Stage				
154 / 254	1.492(e)	Surcharge - Late filing fee or oath or declaration	130.00 /	65.00
156	1.492(f)	English translation - after twenty months	130.00	
956 / 957	1.492(a)(1)	IPEA - U.S.	620.00 /	310.00
958 / 959	1.492(a)(2)	ISA - U.S.	690.00 /	345.00
960 / 961	1.492(a)(3)	PTO not ISA or IPEA	920.00 /	460.00
962 / 963	1.492(a)(4)	Claims meet PCT Article 33(1)-(4) - IPEA - U.S.	90.00 /	45.00
964 / 965	1.492(b)	Claims - extra independent (over three)	72.00 /	36.00
966 / 967	1.492(c)	Claims - extra total (over twenty)	20.00 /	10.00
968 / 969	1.492(d)	Claims - multiple dependent	220.00 /	110.00
970 / 971	1.492(a)(5)	For filing with EPO or JPO search report	800.00 /	400.00
PCT Fees - International Stage				
150	1.445(a)(1)	Transmittal fee	190.00	
151	1.445(a)(2)	PCT search fee - no U.S. application	600.00†	
152	1.445 (a)(3)	Supplemental search per additional invention	160.00†	
153	1.445(a)(2)	PCT search- prior U.S. application	400.00†	
190	1.482(a)(1)	Preliminary examination fee - ISA was the U.S.	440.00†	
191	1.482(a)(1)	Preliminary examination fee - ISA not the U.S.	650.00†	
192	1.482(a)(2)	Additional invention - ISA was the U.S.	140.00†	
193	1.482(a)(2)	Additional invention - ISA not the U.S.	220.00†	
PCT Fees to WIPO				
800		Basic fee (first thirty pages)	490.00*	
801		Basic supplemental fee (for each page over thirty)	10.00*	
803		Handling fee	150.00*	
803 - 896		Designation fee per country	119.00*	
PCT Fee to EPO				
802		International search	1,320.00	

†Effective December 27, 1991.

*WIPO fees subject to periodic change due to fluctuations in exchange rate. Refer to Patent Official Gazette for current amounts.

Fee Code	37 CFR	Description	Fee
Patent Service Fees			
561	1.19(a)(1)(i)	Printed copy of patent w/o color, regular service	3.00
562	1.19(a)(1)(ii)	Printed copy of patent w/o color, expedited local service	6.00
563	1.19(a)(1)(iii)	Printed copy of patent w/o color, ordered via EOS, expedited service	25.00
564	1.19(a)(2)	Printed copy of plant patent, in color	12.00
565	1.19(a)(3)	Copy of utility patent or SIR, with color drawings	24.00
566	1.19(b)(1)(i)	Certified or uncertified copy of patent application as filed, regular service	12.00
567	1.19(b)(1)(ii)	Certified or uncertified copy of patent application, expedited local service	24.00
568	1.19(b)(2)	Certified or uncertified copy of patent-related file wrapper and contents	150.00
569	1.19(b)(3)	Certified or uncertified copy of document, unless otherwise provided	25.00
570	1.19(b)(4)	For assignment records, abstract of title and certification, per patent	20.00
571	1.19(c)	Library Service	50.00
572	1.19(d)	List of U.S. patents and SIRs in subclass	3.00
573	1.19(e)	Uncertified statement re status of maintenance fee payments	10.00
574	1.19(f)	Copy of non-U.S. document	12.00
575	1.19(g)	Comparing and Certifying Copies, Per Document, Per Copy	25.00
576	1.19(h)	Additional filing receipt, duplicate or corrected due to applicant error	20.00
577	1.21(c)	Filing a Disclosure Document	10.00
578	1.21(d)	Local delivery box rental, per annum	50.00
579	1.21(e)	International type search report	35.00
580	1.21(g)	Self-service copy charge, per page	0.25
581	1.21(h)	Recording each patent assignment, agreement or other paper, per property	40.00
583	1.21(i)	Publication in Official Gazette	20.00
584	1.21(j)	Labor charges for services, per hour or fraction thereof	30.00
585	1.21(k)	Unspecified other services	AT COST
586	1.21(l)	Retaining abandoned application	130.00
587	1.21(n)	Handling fee for incomplete or improper application	130.00
588	1.21(o)	Automated Patent System (APS- text) terminal session time, per hr.	40.00
589	1.296	Handling fee for withdrawal of SIR	130.00
590	1.24	Patent coupons	3.00
Patent Enrollment Fees			
609	1.21(a)(1)	Admission to examination	290.00
610	1.21(a)(2)	Registration to practice	100.00
611	1.21(a)(3)	Reinstatement to practice	15.00
612	1.21(a)(4)	Copy of certificate of good standing	10.00
613	1.21(a)(4)	Certificate of good standing - suitable for framing	20.00
615	1.21(a)(5)	Review of decision of Director, Office of Enrollment and Discipline	120.00
616	1.21(a)(6)	Regrading of Examination	120.00

Fee Code	37 CFR	Description	Fee

TRADEMARK FEES

Trademark Processing Fees

361	2.6(a)(1)	Application for registration, per class	200.00
362	2.6(a)(2)	Filing an Amendment to Allege Use under § 1(c), per class	100.00
363	2.6(a)(3)	Filing a Statement of Use under § 1(d)(1), per class	100.00
364	2.6(a)(4)	Filing a Request for Six-months Extension of Time for Filing a Statement of Use under § 1(d)(1), per class	100.00
365	2.6(a)(5)	Application for renewal, per class	300.00
366	2.6(a)(6)	Additional fee for late renewal, per class	100.00
367	2.6(a)(7)	Publication of mark under §12(c), per class	100.00
368	2.6(a)(8)	Issuing new certificate of registration	100.00
369	2.6(a)(9)	Certificate of Correction, registrant's error	100.00
370	2.6(a)(10)	Filing disclaimer to registration	100.00
371	2.6(a)(11)	Filing amendment to registration	100.00
372	2.6(a)(12)	Filing § 8 affidavit, per class	100.00
373	2.6(a)(13)	Filing § 15 affidavit, per class	100.00
374	2.6(a)(14)	Filing combined §§ 8 & 15 affidavit, per class	200.00
375	2.6(a)(15)	Petition to the Commissioner	100.00
376	2.6(a)(16)	Petition for cancellation, per class	200.00
377	2.6(a)(17)	Notice of opposition, per class	200.00
378	2.6(a)(18)	Ex parte appeal, per class	100.00

Trademark Service Fees

461	2.6(b)(1)(i)	Printed copy of each registered mark, regular service	3.00
462	2.6(b)(1)(ii)	Printed copy of each registered mark, expedited local service	6.00
463	2.6(b)(1)(iii)	Printed copy of each registered mark ordered via EOS, expedited service	25.00
464	2.6(b)(4)(i)	Certified copy of registered mark, with title and/or status, regular service	10.00
465	2.6(b)(4)(ii)	Certified copy of registered mark, with title and/or status, expedited local service	20.00
466	2.6(b)(2)(i)	Certified or uncertified copy of trademark application as filed, regular service	12.00
467	2.6(b)(2)(ii)	Certified or uncertified copy of trademark application as filed, expedited local service	24.00
468	2.6(b)(3)	Certified or uncertified copy of trademark-related file wrapper and contents	50.00
469	2.6(b)(5)	Certified or uncertified copy of trademark document, unless otherwise provided	25.00
470	2.6(b)(7)	For assignment records, abstracts of title and certification per registration	20.00
475	1.19(g)	Comparing and certifying copies, per document, per copy	25.00
480	2.6(b)(9)	Self-service copy charge, per page	0.25
481	2.6(b)(6)	Recording trademark assignment, agreement or other paper, first mark per document	40.00
482		For second and subsequent marks in the same document	25.00
484	2.6(b)(10)	Labor charges for services, per hour or fraction thereof	30.00
485	2.6(b)(11)	Unspecified other services	AT COST
488	2.6(b)(8)	Each hour of T-SEARCH terminal session time	40.00
490	1.24	Trademark coupons	3.00

GENERAL FEES

Finance Service Fees

607	1.21(b-1)	Establish deposit account	10.00
608	1.21(b)(2)	Service charge for below minimum balance	20.00
608	1.21(b)(3)	Service charge for below minimum balance restricted subscription deposit account	20.00
617	1.21(m)	Processing returned checks	50.00

Computer Service Fees

618		Computer records	AT COST

DEPARTMENT OF COMMERCE Billing Code: 3510-16-M

Patent and Trademark Office

37 CFR Parts 1 and 2

[Docket No. 910373-1297]

RIN 0651-AA45

Revision of Patent and Trademark Fees

AGENCY: Patent and Trademark Office, Commerce

ACTION: Final rule.

SUMMARY: The Patent and Trademark Office (PTO) is amending the rules of practice in patent and trademark cases, Parts 1 and 2 of title 37, Code of Federal Regulations, to adjust certain patent and trademark fee amounts and to amend certain procedures in accordance with the applicable provisions of the Patent and Trademark Office Authorization Act of 1991, which was passed by the House of Representatives on November 25, 1991, and by the Senate on November 27, 1991, as H.R. 3531, and signed into law on December 10, 1991.

H.R. 3531 subsections 5(a)(1) and (2), sets base amounts for fees established by 35 U.S.C. 41(a) and 41(b). Subsections 5(a)(1) and (2) also add certain fees related to national processing of Patent Cooperation Treaty applications and maintenance fees established under Pub. L. 96-517 to 35 U.S.C. 41(a) and 41(b), respectively. The base amounts set by subsections 5(a)(1) and (2) are subject to the surcharge to be set by the Commissioner to recover the deficit reduction target of $95,000,000 in fiscal year 1992 as required by the Omnibus Budget Reconciliation Act of 1990, Pub. L. 101-508, as amended by subsection 2(a) of H.R. 3531. Subsection 5(a)(3) of H.R. 3531 gives the Commissioner authority to establish fees under 35 U.S.C. 41(d) to recover average costs, and sets the fee amount for three specific services provided by the PTO. The small entity provision, 35 U.S.C. 41(h), is continued. The small entity provision is also made applicable to maintenance fee payments based on applications filed on or after December 12, 1980, but before August 27, 1982, and to certain fees related to the national processing of Patent Cooperation Treaty (PCT) applications. H.R. 3531 allows the adjustment of trademark fees to reflect fluctuations in the Consumer Price Index (CPI).

EFFECTIVE DATE: The rules are effective December 16, 1991 except for §§ 1.445(a) and 1.1482(a) which will be effective on December 27, 1991.

FOR FURTHER INFORMATION CONTACT: Frances Michalkewicz by telephone at (703) 305-8510 or by mail marked to her attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

SUPPLEMENTARY INFORMATION: This rule change is designed to adjust the Patent and Trademark Office fees in accordance with the provisions of H.R. 3531. Patent and trademark fees were set on October 1, 1982, in accordance with the provisions of title 35, United States Code, and the provisions of section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113).

On November 5, 1990, the Omnibus Budget Reconciliation Act of 1990 (Pub. L. 101-508) imposed a 69 percent surcharge on all patent fees set under 35 U.S.C. 41(a) and (b). Section 10101 of Pub. L. 101-508 required the Commissioner to make recommendations for any statutory changes necessary to implement new fee proposals. PTO's authorizing legislation (Pub. L. 100-703) was to expire on September 30, 1991. Legislation to authorize appropriations for the Patent and Trademark Office for fiscal years 1992 and 1993 and for other purposes was introduced in the House of Representatives on March 22, 1991, as H.R. 1613, and in the Senate on April 9, 1991, as S. 793.

A notice of proposed rulemaking to adjust patent and trademark fees in accordance with the proposed provisions of H.R. 1613 and S. 793 was published in the *Federal Register* on May 10, 1991, at 56 FR 21890, and in the *Official Gazette* on May 21, 1991, at 1126 OG 56. A public hearing on the notice of proposed rulemaking was held on June 12, 1991.

For fiscal year 1992, H.R. 3531 waives requirements for advance publication, notice and comment contained in the patent and trademark laws and the Administrative Procedures Act, and revised fee amounts take effect on or after one day after publication in the *Federal Register*. To provide continuity, this final rule package modifies the notice of proposed rulemaking that was published in the *Federal Register* on May 10, 1991, to reflect the provisions of H.R. 3531. Comments received in response to the notice of proposed rulemaking have been addressed, even though certain comments may have been rendered moot by provisions of H.R. 3531.

BACKGROUND:

Statutory Provisions

Patent fees are authorized by 35 U.S.C. 41 and 35 U.S.C. 376. Subsections 41(a) and (b) of title 35, United States Code, establish a number of statutory fees. Among them are fees for filing a patent application, issuing a patent, and maintaining a patent in force. Subsections 5(a)(1) and (2) of H.R. 3531 amend 35 U.S.C. 41(a) and (b) by adjusting the amounts of the patent statutory fees currently established by those subsections, and by specifying certain fees related to the national processing of Patent Cooperation Treaty applications and maintenance fees on patent applications filed on or after December 12, 1980, but before August 27, 1982, in 35 U.S.C. 41(a) and 41(b), respectively.

The Omnibus Budget Reconciliation Act of 1990, Pub. L. 101-508, imposed a 69 percent surcharge on all fees authorized by 35 U.S.C. 41(a) and (b), effective November 5, 1990. Subsection 2(b) of H.R. 3531 amends that Act to require the Commissioner to establish surcharges under section 10101(a) of Pub. L. 101-508 on all fees established under 35 U.S.C. 41(a) and 41(b) to recover $95,000,000 in fiscal year 1992.

Subsection 41(h) of title 35, United States Code, authorizes a 50 percent reduction in the fees paid under 35 U.S.C. 41(a) and 41(b) by independent inventors, small business concerns, and nonprofit organizations who meet the prescribed definitions. This reduction will apply to the fees newly established in subsections 41(a) and 41(b).

Subsection 5(a)(3) of H.R. 3531 amends 35 U.S.C. 41(d) to allow the Commissioner to establish fees for all other processing, services, or materials related to patents and not

specified in the amended section 41 to recover the average cost of providing these services or materials. Section 5(a)(3) also establishes the amounts for three services.

Subsection 5(b) of H.R. 3531 amends subsection 41(f) of title 35, United States Code, to provide that fees set under 35 U.S.C. 41(a) and (b) may be adjusted on October 1, 1992, and every year thereafter, to reflect fluctuations in the CPI over the previous 12 months.

Subsection 5(c) amends subsection 41(g) of title 35, United States Code, to allow new fee amounts established by the Commissioner under section 41 to take effect thirty days after notice in the *Federal Register* and the Patent and Trademark Office *Official Gazette*. However, sections 2(c), 5(c)(2) and 13 of H.R. 3531 provide that patent fees established for fiscal year 1992 will take effect on or after one day after such fees are published in the *Federal Register*.

Section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. 1113), authorizes the Commissioner to establish fees for the filing and processing of an application for the registration of a trademark or other mark, and for all other services and materials relating to trademarks and other marks.

Subsection 42(c) of title 35, United States Code, provides that trademark fees available to the Commissioner are to be used exclusively for the processing of trademark registrations and for other services and materials related to trademarks. Subsection 5(e) of H.R. 3531 modifies 35 U.S.C. 42(c) so that trademark fees may be used for the processing of trademark registrations and for other activities, services, and materials relating to trademarks and to cover a proportionate share of the administrative costs of the PTO.

Subsection 5(f) amends section 31(a) of the Trademark Act of 1946 (15 U.S.C. 1113(a)) to allow trademark fees to be adjusted once each year to reflect, in the aggregate, any fluctuations during the preceding 12 months in the CPI. However, during fiscal year 1992, trademark fees may be adjusted to reflect fluctuations in the CPI during the preceding three years.

Subsection 5(f) also amends section 31 to allow new fee amounts to take effect thirty days after notice in the *Federal Register* and the Patent and Trademark *Official Gazette*. However, fees established for fiscal year 1992 will take effect on or after one day after such fees are published in the *Federal Register*.

Subsection 5(g) of H.R. 3531 makes conforming amendments to section 376 of title 35, United States Code, that authorizes the establishment of fees related to applications filed under the provisions of the PCT. Under current law, section 376 permits the Commissioner to set certain fees related to these applications. Amendments made in subsection 5(a)(1) of H.R. 3531, however, set some PCT-related fees in the new subsection 41(a).

Revised fee amounts go into effect on the effective date noted above, with the exception of certain PCT fees (1.445(a), and 1.482(a)), which go into effect on December 27, 1991. Under an agreement between the PTO and the World Intellectual Property Organization (WIPO) which establishes PTO as an International Searching and Examining Authority under the PCT, any amendment to certain PCT fees can take effect only after PTO provides 30 days written notice to WIPO. Notice concerning the increase to PCT international fees for international applications filed in the United States Receiving

Office is included as Appendix A, and a current schedule of PCT fees, with specific effective dates, is included as Appendix B.

General Procedures

Recovery Level Determinations: Fees have been adjusted for a planned recovery of $426,000,000 in fiscal year 1992. The fiscal year 1992 PTO budget will be adjusted accordingly.

Amounts for fees established by 35 U.S.C. 41(a) and 41(b) and 371(c)(1) are amended by H.R. 3531. Subsections 41(a) and 41(b) of title 35, United States Code, now include certain fees related to the national processing of PCT applications and maintenance fees on patent applications filed on or after December 12, 1980, but before August 27, 1982. Fee amounts established by subsections 41(a) and 41(b) are subject to the provisions of the Omnibus Budget Reconciliation Act of 1990, as amended by H.R. 3531. These provisions require that $95 million be raised in fiscal year 1992 for deficit reduction purposes. As a result, the fees established in subsections 41(a) and 41(b) have been increased by 38 percent to generate this $95,000,000 in fiscal year 1992.

After application of the 38 percent increase to the base fees, amounts were rounded by applying standard arithmetical rules so that the amounts rounded would be de minimis and convenient to the user. Fees of $100 or more were rounded to the nearest $10. Fees between $2 and $99 were rounded to the nearest even number so that the comparable small entity fee would be a whole number.

Non-statutory patent service fees and PCT processing fees are adjusted to recover planned costs for 1992. However, three patent service fees are set by statute. These are assignment fees, printed patent copy fees and photocopy charge fees. In response to comments on the proposed level of the non-statutory patent fee amounts and the direction by Congress to reduce costs overall and, hence, associated fees, from the requested 1992 budget of $462 million to a level of $426 million, many of the adopted fee amounts are less than the proposed amounts.

Subsection 5(f)(2) of H.R. 3531 allows trademark fees to be adjusted in fiscal year 1992 to reflect changes over the prior three fiscal years in the Consumer Price Index. The Office of Management and Budget has determined that the PTO should use Consumer Price Index-U to adjust trademark fees. The Department of Labor's Consumer Price Index is made public approximately 21 days after the end of the month being calculated. The trademark fees are being adjusted by 13.8 percent.

Workload Projections: Determination of workloads varies by fee code. Principal workload projection techniques are as follows:

Patent and trademark application workloads are projected from statistical regression models using recent application trends. Patent issues are projected from an in-house patent production model and reflect examiner production achievements and goals. Patent maintenance fee workloads utilize patents issued 3.5, 7.5 and 11.5 years prior to payment and assume payment rates of 75 percent, 50 percent and 25 percent, respectively. Trademark affidavit projections are based on filing trends for marks registered five to six years prior. Trademark renewal projections are based on marks registered 20 years prior to 1992. Service fee workloads follow linear trends from prior year activities. Workload estimates are calculated by the PTO's Office of Budget and the office responsible for the fee activity.

A comparison of existing and revised fee amounts is included as Appendix C to this notice.

Any fee amount that is paid on or after the effective date is subject to the new fee schedule. For purposes of determining the amount of the fee to be paid, the date of mailing indicated on a proper Certificate of Mailing, where authorized under 37 CFR 1.8, will be considered to be the date of receipt in the PTO. A "Certificate of Mailing under section 1.8" is not "proper" for items which are specifically excluded from the provisions of section 1.8. Section 1.8(a)(2) should be consulted for those items for which a Certificate of Mailing is not "proper." Such items include, inter alia, the filing of national and international applications for patents and the filing of trademark applications. The provisions of 37 CFR 1.10 relating to filing papers and fees with an "Express Mail" certificate, however, do apply to any paper or fee (including patent and trademark applications) to be filed in the PTO. If an application or fee is filed by "Express Mail" with a proper certificate dated on or after the effective date of the rules, the amount of the fee to be paid is the fee established herein.

A discussion of specific sections is set forth below.

DISCUSSION OF SPECIFIC RULES

37 CFR 1.12 Assignment records open to public inspection.

Section 1.12, paragraph (a), is amended to change the reference for payment of a fee to section 1.19(b)(3), and add a reference to the fee set in the trademark rules at section 2.6(b)(5). Section 1.12, paragraph (d), is amended to change the reference for payment of a fee to section 1.21(j), and add a reference to the fee set in the trademark rules at section 2.6(b)(10).

37 CFR 1.13 Copies and certified copies

Section 1.13 is amended to revise paragraph (b) to be consistent with revisions to paragraphs 1.19(b) and 2.6(b).

37 CFR 1.16 National application filing fee.

Section 1.16, paragraphs (a), (b), (d) and (f)-(j), is revised to reflect the amendments made by subsections 2(b) and 5(a)(1) of H.R. 3531 as described above under General Procedures.

Section 1.16, paragraph (e), is revised to adjust the patent application surcharge fee authorized by 35 U.S.C. 41(d) and 111. Paragraph (e) has been modified from the proposal to provide a two-tier fee structure for the payment of the surcharge. The fifty percent reduction for those that have established small entity status is applicable to the surcharge for filing the basic filing fee, oath or declaration on a date later than the filing date of the application. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amount is less than the amount proposed.

37 CFR 1.17 Patent application processing fees.

Section 1.17, paragraphs (a)-(g), (l) and (m), is revised to reflect the amendments made by subsections 2(b) and 5(a)(1) of H.R. 3531 as described above under General Procedures.

Section 1.17, paragraphs (h)-(k), is revised to adjust fees authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amounts are less than the proposed amounts.

Section 1.17, paragraphs (n) and (o), is revised to adjust fees authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. The fee amounts in 37 CFR 1.17(n) and (o) are higher than proposed because the amount of the application basic filing fee on which these amounts are based was increased by subsections 2(b) and 5(a)(1) of H.R. 3531.

37 CFR 1.18 Patent issue fees.

Section 1.18 is revised to reflect the amendments made by subsections 2(b) and 5(a)(1) of H.R. 3531 as described above under General Procedures.

37 CFR 1.19 Document supply fees.

Section 1.19, paragraphs (a), (b) and (d)-(h), is revised to adjust fees authorized by 35 U.S.C. 41(d) as amended by 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amounts in paragraphs (a)(1)(iii), (a)(2), (a)(3), (b)(1), (b)(4), (d), and (f) are less than the proposed amounts.

Section 1.19 is revised further to establish that the Office will sell certified or uncertified copies of documents at the same flat fee. Most requests for documents are for certified copies. Customers who need uncertified copies of documents or copies of portions of documents also are able to make those copies themselves at a self-service copy charge, per page.

Subparagraph (a)(1) also is revised to clarify and set fees for different levels of service available for obtaining copies of patents in black and white. In addition to regular service, the PTO will provide for expedited local service to be fulfilled within one workday for orders delivered to the Public Service Window at double the fee amount set for regular service; and expedited service for copies ordered via electronic ordering service and delivered by overnight delivery service as previously provided by subparagraph (a)(6). There are two Public Service Windows at the PTO: one in the Patent Search Room and another in the Trademark Search Library. Unless otherwise requested, copies of patents will be delivered to the Public Service Window in the Patent Search Room.

Section 1.19, subparagraph (a)(2), is revised further to delete reference to copies of statutory invention registrations in color, which will be provided by renumbered subparagraph (a)(3).

Section 1.19 is revised to delete existing subparagraph (a)(3). In the future, the PTO only will provide certified or uncertified copies of documents at a flat fee, as set forth in renumbered subparagraph (b)(3).

Section 1.19, renumbered subparagraph (a)(3), is revised further to clarify and set fees for different levels of service available for obtaining copies of utility patents or statutory invention registrations containing color drawings. Subparagraph (a)(3) has been modified from the proposal to delete reference to expedited local service because this service cannot be provided by the PTO contractor.

Section 1.19 is revised further to delete subparagraphs (a)(5) and (a)(6). The service formerly provided under subparagraph (a)(5) will be provided under subparagraphs (a)(1)(ii) and (a)(2)(ii), and the service formerly provided under subparagraph (a)(6) will be provided under (a)(1)(iii).

Section 1.19, subparagraph (b)(1), is revised further to clarify and set fees for different levels of service available for obtaining certified or uncertified copies of patent applications as filed. In addition to regular service, the PTO will provide for expedited service, fulfilled within five work days, excluding mailing time, at double the fee amount set for regular service.

Section 1.19, subparagraph (b)(2), is revised to reduce the fee for providing a certified or uncertified copy of a patent file wrapper and contents.

Section 1.19 is revised further to delete existing subparagraph (b)(3). Certified or uncertified copies of assignment records will be provided under renumbered subparagraph (b)(4).

Section 1.19 is revised further to delete existing subparagraph (b)(4). Certified or uncertified copies of Office records will be provided under renumbered subparagraph (b)(3). Expedited service as currently provided under existing subparagraph (b)(4) will be provided under subparagraph (b)(1)(ii).

Section 1.19 is revised further to renumber subparagraph (b)(5) as (b)(3). Section 1.19, subparagraph (b)(3), is revised to establish that the PTO provides certified or uncertified copies of documents at one flat fee amount.

Section 1.19 is revised further to renumber subparagraph (b)(6) as (b)(4) and to include services formerly provided under subparagraph (b)(3) in addition to certified and uncertified copies of abstracts of title.

Section 1.19, paragraph (g), is modified from the proposal. The PTO will continue to compare and certify copies of documents made from PTO records, but not prepared by PTO staff.

37 CFR 1.20 Post-issuance fees.

Section 1.20, paragraphs (a)-(c), is revised to adjust the fees authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to

recover a lower level of planned costs overall, the adopted fee amounts are less than the amounts proposed.

Section 1.20, paragraph (d), is revised to reflect the amendments made by subsections 2(b) and 5(a)(1) of H.R. 3531 as described above under General Procedures.

Section 1.20, paragraphs (e)-(g), is revised to reflect the amendments made by subsections 2(b) and 5(a)(2) of H.R. 3531 as described above under General Procedures, and to provide for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on all applications filed on or after December 12, 1980. Paragraphs (e)-(g) formerly provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraphs (h)-(j), which are deleted, provided for the payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982. The distinction in the maintenance fee due based on the application filing date was eliminated by subsection 5(a)(2) of H.R. 3531.

For patents based on applications filed on or after December 12, 1980, but before August 27, 1982, patent owners must establish small entity status according to 37 CFR 1.27 if they have not done so and if they wish to pay the reduced fee amounts.

Section 1.20 is revised to delete paragraphs (h)-(j). The fees for maintaining all original or reissue patents, except design or plant patents, including those based on applications filed on or after August 27, 1982, are set forth in paragraphs (e)-(g). Reissue patentees are reminded that the due dates for payment of maintenance fees are computed from the date of grant of the original (non-reissue) patent.

Section 1.20 is revised to renumber paragraph (k) as paragraph (h), and adjust the fee amount authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. Revised paragraph (h) provides for a surcharge for payment of a maintenance fee during the six-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after December 12, 1980. Paragraph (k) formerly provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, but before August 27, 1982. Paragraph (l), which is deleted, provided for a surcharge for late payment of maintenance fees on original and reissue patents, except design or plant patents, based on applications filed on or after August 27, 1982.

Section 1.20, new paragraph (h), has been modified from the proposal to provide a two-tier fee structure for payment of the maintenance fee surcharge. The fifty percent reduction for those that have established small entity status is applicable to the surcharge for payment of maintenance fees within the six-month grace period. Further, in response to comments and Congressional direction, the adopted fee amount is less than the amount proposed.

Section 1.20 is revised to delete paragraph (l). The fees for the late payment of a maintenance fee for all original or reissue patents, except design or plant patents, based on applications filed on or after December 12, 1980, are set forth in renumbered paragraph (h).

Section 1.20 is revised to renumber paragraphs (m) and (n) as paragraphs (i) and (j), and adjust the fee amounts as authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. Further, in response to comments and Congressional direction, the adopted fee amount in paragraph (i) is less than the amount proposed.

37 CFR 1.21 Miscellaneous fees and charges.

Section 1.21, paragraphs (a), (c), (e), (g), (h), (j), (l) and (n), is revised to adjust fees as authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amounts in sub-paragraphs (a)(1), (a)(3), (a)(5), (a)(6), (j), (l) and (n) are less than the amounts proposed. The proposed changes to paragraphs (d) and (m) have not been adopted.

Section 1.21, subparagraph (a)(4), is revised further to provide a certificate of good standing for $10 and a certificate that is suitable for framing at double that fee amount.

Section 1.21, subparagraph (b)(1), is revised to eliminate the fee requirement for reinstating a deposit account. This fee requirement has been found to be unnecessary because the Office no longer suspends accounts when there is no activity.

Section 1.21 is revised to delete paragraph (f), since searching PTO records will be provided under revised paragraph (j). Paragraph (f) is reserved.

Section 1.21, paragraph (g), is revised further to clarify that the $.25 fee amount for each photocopy established by subsection 5(a)(3) of H.R. 3531 is for a self-service copy charge amount, per page. The self-service copy charge will be applied to the per copy amounts on copy access system cards as previously provided by this paragraph.

The same copy charge will be required for each printed page generated from the Automated Patent System, as previously provided by paragraph (q).

Section 1.21, paragraph (h), is revised to establish the fee for recording each assignment in accordance with subsection 5(a)(3) of H.R. 3531.

Section 1.21, paragraph (j), is revised to eliminate the fee for providing duplicate Office user passes. The Office will provide duplicate passes free of charge.

Revised paragraph (j) establishes one fee amount for each hour of service, or fraction thereof, requested from the PTO. Examples of services are searching PTO records, as previously provided by this paragraph; PTO staff assistance to conduct a search using the Automated Patent System, as previously provided in paragraph (p); and other miscellaneous requests for services where PTO staff are providing direct labor support to customers.

Section 1.21, paragraph (k), is revised to require the payment of the actual cost for performing special services provided by the PTO. Generally, services provided by the PTO would be charged at the $30.00 hourly rate set forth in paragraph (j) of this section. Paragraph (k) is reserved for non-labor charges, such as computer services, special supplies, extra mailing costs, etc., that are authorized by the customer.

37 CFR 1.24 Coupons.

Section 1.24 is revised to adjust the fee for the purchase of coupons for patents and trademarks to make it comparable to the fee required for the purchase of copies of patents and trademarks and to adjust the amount of the coupon books.

37 CFR 1.26 Refunds.

Section 1.26, paragraph (c), is revised to provide for a refund of $1,635 if the Commissioner decides not to institute reexamination proceedings. The $1,635 refund would apply to those instances where the proposed reexamination fee of $2,180 under 37 CFR 1.20(c) was paid. The current $1,500 refund would be made in those cases where the current $2,000 reexamination fee was paid.

37 CFR 1.171 Application for reissue.

Section 1.171, paragraph (a), is revised to change the reference for payment of a fee for a title report to section 1.19(b)(4).

37 CFR 1.296 Withdrawal of request for publication of statutory invention registration.

Section 1.296 is revised to adjust the handling fee for withdrawal of a statutory invention registration as authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amount is less than the proposed amount.

37 CFR 1.362 Time for payment of maintenance fees.

Section 1.362 is amended to revise paragraphs (a) and (e) to refer to renumbered paragraphs in section 1.20, and to revise paragraph (b) to clarify that maintenance fees are not required for any plant or design patents.

37 CFR 1.378 Acceptance of delayed payment of maintenance fee in expired patent to reinstate patent.

Section 1.378 is amended to revise paragraphs (a)-(c) and (e) to refer to renumbered paragraphs in section 1.20.

37 CFR 1.445 International application filing, processing, and search fees.

Section 1.445 is revised to adjust the fees authorized by 35 U.S.C. 376 for international application processing as set forth in 37 CFR 1.445(a) in accordance with subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amounts are less than the amounts proposed.

37 CFR 1.482 International preliminary examination fees.

Section 1.482 is revised to adjust the fees in paragraph (a) in accordance with subsection 5(a)(3) of H.R. 3531. In response to comments on the proposed level of the non-statutory patent fee amounts and Congressional direction to recover a lower level of planned costs overall, the adopted fee amount is less than the amount proposed.

37 CFR 1.492 National stage fees.

Section 1.492, paragraphs (a)-(d), is revised to reflect the amendments made by subsections 2(b) and 5(a)(1) and 5(g) of H.R. 3531 as described above under General Procedures.

Section 1.492 is revised further to add new subparagraph (a)(5) to set forth a fee upon entering the national stage when a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office. The proposed fee amount includes a reduction approximately equivalent to the reduction of 20 percent of the cost of conducting a search that is given by the European and Japanese Patent Offices upon entering the national stage when a search report in an international application has been prepared by the U.S. Patent and Trademark Office.

Section 1.492, paragraphs (e) and (f), is revised to adjust fees authorized by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531. Paragraph (e) has been modified from the proposal to provide a two-tier fee structure for payment of the surcharge. The fifty percent reduction for those who have established small entity status is applicable to the surcharge for late filing of the basic national fee or oath or declaration later than 20 months from the priority date.

37 CFR 1.740 Application for extension of patent term.

Section 1.740, paragraph (a)(14), is revised to change the reference to the rule for extension of a patent term to section 1.20(j).

37 CFR 1.770 Express withdrawal of application for extension of patent term.

Section 1.770 is revised to change the reference to the rule for extension of a patent term to section 1.20(j).

37 CFR 2.6 Trademark fees.

Section 2.6 is revised to be divided into two sections. Revised paragraph (a) includes all trademark processing fees and revised paragraph (b) includes all trademark service fees. Paragraphs (a) and (u) are renumbered as subparagraphs (a)(1) and (a)(2); paragraphs (v), (b), (s), (c)-(l) are renumbered as subparagraph (a)(4)-(a)(16), respectively; and paragraph (m) is renumbered as subparagraph (a)(18). New subparagraphs (a)(3) and (a)(17) are added.

Paragraph (n) is renumbered as subparagraph (b)(1); paragraphs (o), (q), (r), and (w) are renumbered as subparagraphs (b)(5)-(b)(8), respectively; and paragraph (t) is renumbered as subparagraph (b)(11). New subparagraphs (b)(2)-(b)(4), (b)(9) and (b)(10) are added.

Section 2.6, renumbered paragraphs (a)(1) and (b), is revised further to adjust fee amounts in accordance with subsection 5(f) of H.R. 3531. In response to comments on the proposed level of the trademark fee amounts and Congressional direction to limit adjustments to fluctuations in the Consumer Price Index, the adopted fee amounts in subparagraphs (a)(1), (b)(1)(iii), (b)(2), (b)(4), (b)(7), and (b)(10) are less than the proposed amounts. The proposed changes to subparagraphs (a)(6) and (a)(12)-(18) have not been adopted.

Subparagraph (a)(2) is revised further to delete reference to filing a statement of use. New subparagraph (a)(3) is established for filing a statement of use under section (1)(d)(1) of the Act, per class. This clarifies that a $100 fee amount is due for each action requested.

Subparagraph (a)(5) has been modified from the proposal so that the words "an application" are not deleted.

Subparagraph (a)(6) is revised further to clarify the requirement for paying an additional fee for a renewal application made within three months of the expiration of the registration.

Subparagraph (a)(16) is revised further to delete reference to filing a notice of opposition. New subparagraph (a)(17) is established for filing a notice of opposition.

Section 2.6(b) is revised further to establish that the Office will sell certified or uncertified copies of documents at the same flat fee. Most requests for documents are for certified copies. Customers who need uncertified copies of documents or copies of portions of documents also are able to make those copies themselves for a self-service copy charge, per page.

Subparagraph (b)(1) is revised further to delete reference to a copy showing title and/or status. In addition, this subparagraph clarifies the levels of service available for obtaining printed copies of trademarks. In addition to regular service provided by subparagraph (b)(1)(i), the PTO will provide, in new subparagraph (b)(1)(ii), for expedited local service to be fulfilled within one workday for orders delivered to a Public Service Window at double the fee amount for regular service. There are two Public Service Windows at the PTO: one in the Patent Search Room and another in the Trademark Search Library. Unless otherwise requested, all copies of trademarks will be delivered to the Public Service Window in the Trademark Search Library. New subparagraph (b)(1)(iii) establishes a fee for providing expedited service for a copy of a registered mark ordered by electronic ordering service and delivered to the customer within two workdays.

Under new subparagraph (b)(2), the PTO will provide a certified or uncertified copy of a trademark application as filed. In addition to regular service provided under (b)(2)(i), the PTO will provide, in subparagraph (b)(2)(ii), for expedited service fulfilled within five workdays, excluding mailing time, at double the fee amount for regular service.

Under subparagraph (b)(3), the PTO will provide certified or uncertified copies of trademark file wrappers and contents at the same flat fee amount.

Subparagraph (b)(4) is revised further to provide certified copies of registered marks, showing title and/or status, as provided under the current section 2.6(n). In addition to regular service provided by (b)(4)(i) at a fee, the PTO will provide, in subparagraph (b)(4)(ii), for expedited service fulfilled within five workdays from receipt of request in the Trademark Post-Registration Division, excluding mailing time, at double the fee amount for regular service.

Subparagraph (b)(5) is revised further to provide certified or uncertified copies of trademark records, per document, except as otherwise provided in this section, at a flat fee amount. Further, expedited services now are included as subparagraphs (b)(2)(ii) and (b)(4)(ii).

Section 2.6 is revised to delete existing paragraph (p). A self-service copy charge is provided in subparagraph (b)(9) of this section.

Section 2.6, subparagraph (b)(6), has been modified from the proposal to establish a fee of $40 for the first property and a fee of $25 for all subsequent properties.

Subparagraph (b)(7) is revised further to clarify that the fee amount charged will cover a search of assignment records and an abstract of title and certification.

Section 2.6 is revised to delete paragraph (x). This service will be provided under proposed subparagraph (b)(9).

New subparagraph (b)(9) will establish a self-service copy charge, per page, and will be a replacement for the services offered in paragraphs (p) and (x) which are being deleted. The $.25 self-service copy charge will be applied to the per copy amounts on copy access system cards, and for each printed page generated from the Automated Trademark System, as previously provided by paragraph (x).

New subparagraph (b)(10) establishes one fee amount for each hour of service, or fraction thereof, requested from the PTO. Examples of services would be searching PTO records, as previously provided by this paragraph, and other miscellaneous requests for services where PTO staff are providing direct labor support to customers.

Subparagraph (b)(11) is revised to clarify that the services to be provided would be those that are not specified elsewhere in the statute or rules. Adding this language makes the wording of this rule comparable to section 1.21(k). Generally, services provided by the PTO will be charged at the $30.00 hourly rate set forth in subparagraph (b)(10) of this section. Subparagraph (b)(11) is reserved for non-labor charges, such as computer services, special supplies, extra mailing costs, etc., that are authorized by the customer.

Response to Comments on The Rules

A notice of proposed rulemaking to adjust patent and trademark fees in accordance with the proposed provisions of H.R. 1613 and S. 793 was published in the *Federal Register* on May 10, 1991, at 56 FR 21890, and in the *Official Gazette* on May 21, 1991, at 1126 OG 56. A public hearing was held on June 12, 1991.

Although comments were received on a variety of subjects related to patent and trademark examination processes, only those relating directly to this notice are being addressed. Other comments relating to patents have been forwarded to the Advisory Commission on Patent Law Reform for their review and consideration. Examples of comments that have been referred to the Advisory Commission include:

Comment: One respondent stated that, because some patentees make money off their patents while others "enhance the progress in the useful arts" by disclosing technology, not all inventors should share the same costs. PTO should investigate measures for decreasing costs, increasing efficiencies, and reallocating costs among users.

Comment: Fees should be raised proportionately without eliminating the two-tier system and with only baseline budgets.

Comment: PTO should set maintenance fees based on the use of the patent; for example, similar to a sales tax which would be reported and paid by the owner of the patent.

Comment: An alternative to the two-tiered system would be a system whereby one-half the fees for a small entity would be deferred until five years after the patent is granted.

Comment: PTO should reexamine the post-issuance process as a potential source of new revenues, e.g., raising fees for assignments and establishing filing fees for the recordation of lawsuits. More intensive use of maintenance fees could result in a trust fund to be used for such major projects as automation.

Comment: The patent system might benefit if PTO were established as a Government corporation. As a Government corporation, the PTO would have the financing and management flexibility which has benefitted other Government agencies.

Comment: PTO should redefine a small entity in order to decrease the number of persons receiving the subsidy.

The following comments relate to the proposed rule notice:

Comment: A majority of the comments received protested the PTO's proposal in H.R. 1613 and S. 793 to limit the small entity subsidy to application fees and claims fees paid upon filing.

Response: As enacted, H.R. 3531, did not contain the proposed change. Therefore, the small entity subsidy provided in 35 U.S.C. 41(h) continues to apply to fees set forth in 35 U.S.C. 41(a) and (b) as amended by subsections 5(a)(1) and (2) of H.R. 3531.

Comment: The PTO should publish an additional fee schedule and invite public comments after legislation is approved by Congress.

Response: Due to the delay in the enactment of PTO's authorization legislation, Congress waived normal notice and comment rulemaking procedures. Thus, H.R. 3531 provides that, in fiscal year 1992, the fees will take effect on or after one day after the fees are published in the *Federal Register*.

Comment: Several respondents indicated that the proposed rules would establish the PTO as a user-funded government agency and, as such, the Office would no longer be subject to Congressional oversight.

Response: The Office became essentially user-fee funded, with the exception of approximately $1.5 million of taxpayer revenues in fiscal year 1992, upon enactment of the Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508) on November 5, 1990. That Act simply changed the source of funding for the PTO but did not change its character as a Federal agency which is part of the Department of Commerce within the Executive Branch. As a Federal agency, the PTO must prepare and submit its annual budget requests to the Secretary of Commerce and the Office of Management and Budget. The PTO's request is included in the President's annual budget submission to Congress. Congress continues to have oversight for PTO programs, and the annual budget request is subject to the Congressional appropriations process. H.R. 3531 also contains a provision whereby the PTO will continue to submit an annual report to the Committees on the Judiciary of the Senate and the House of Representatives which includes fee collections for the prior year; activities during the prior year that were supported by fee expenditures; budget plans for significant programs, projects and

activities; and any proposed disposition of surplus fees by the Office. Furthermore, the PTO is governed by reprogramming guidelines specified in the Department of Commerce's annual appropriations act.

Further, subsection 5(d)(3) of H.R. 3531 requires the Commissioner to report to the Congress, with publication in the *Federal Register*, on the automated search system, and its use by the public.

Comment: Why should present users be forced to support impractical and wasteful PTO programs and policies, such as the automation program and the installation of posh conference rooms.

Response: While questions have been raised as to the source of funding for the PTO's automation program, several witnesses at oversight hearings supported the need to automate patent and trademark operations.

The automation programs are designed to improve the quality and timeliness of PTO services and products, and to discontinue reliance on outmoded manual processes and paper references. These improvements will benefit not only PTO employees but also PTO users. Decisions by Congress on PTO fees in 1992 have been interpreted as supportive of the automation programs (since fees fund the programs), although less funds for the programs will result in slower implementation.

With respect to the PTO's conference rooms, PTO attempts to provide a favorable work environment for its employees and for its customers while they are doing business at the Office.

Comment: PTO should look for hardware and software that is already completed rather than developmental for its automation program.

Response: In March 1988, an Industry Review Panel was established by the Secretary of Commerce to review the Automated Patent System (APS) program. Their findings regarding the design and architecture of APS were: "At this time, there is no totally off-the-shelf system that can provide the capabilities and performance PTO needs for patent search and retrieval. Even the majority of the individual components are not available off-the-shelf. Currently available products do not provide the performance (e.g., flip rate) nor can they handle the workload (e.g., number of users and data volumes) required if APS is to support the examining corps in its day-to-day operations. For example, even considering the recent advances in workstation technology, a custom workstation is needed for APS image retrieval and manipulation."

In light of several technological forecasts performed since then, the PTO continues to agree with this assessment. However, the report also stated, "the PTO should [plan] to re-procure key systems components [at appropriate times] to take advantage of improvements in technology and dropping prices." Therefore, within the last few years, the PTO has begun to reprocure several major APS components, such as the devices used to store electronic images of patents, the workstations used for searching these images, and the network needed to connect APS.

Comment: PTO should determine whether or not private contractors in industry can accomplish functions of the PTO.

Response: PTO has been following the guidelines of OMB Circular A-76, "Performance of Commercial Activities", since 1981. PTO's A-76 studies identified specific savings

that were taken in fiscal years 1983 and 1985 budgets for activities such as file maintenance, facilities management and patent copy fulfillment. The PTO will continue to examine those functions now undertaken by Federal personnel that could be performed by contractor personnel.

Comment: Fee amounts will become unreasonable and unfair if the Commissioner is given the opportunity to increase them every two years.

Response: This provision, which was proposed in H.R. 1613, is not included in the enacted legislation. H.R. 3531 provides that patent statutory fees (for example, filing, issue, and maintenance fees) may be adjusted each year by fluctuations in the Consumer Price Index over the preceding 12 months.

Comment: Congress has given the Commissioner the ability to tax the public by charging fees at amounts greater than the cost of providing the service. In particular, non-statutory fees should be set to recover the actual cost of a service or product and not to recover a percentage of overall operating costs.

Response: H.R. 3531 directs that patent non-statutory fees be established "to recover the estimated average cost to the Office of such processing, services, or materials." Exceptions are assignment, photocopy and printed copy fees which are set by statute. The PTO has complied with Congressional intent on this subject, and many fee amounts have been lowered from the proposal.

Comment: The premises, assumptions and models used in formulating the proposed fees are not provided so that a respondent can determine whether the fee increases are justified.

Response: Since the publication of the notice of proposed rulemaking on May 10, 1991, the PTO's proposals for 1992 fee rates and its budget have undergone significant changes. The proposed rule package would have adjusted fees to recover a 1992 budget of $462 million. The fee adjustments that have been adopted in this final rule package will recover a 1992 budget of $426 million, a reduction of $36 million. This recovery level reflects Congressional views on the amount of change required for each fee and on the content of the 1992 budget request. An explanation of the methodology used in formulating the adopted fee amounts is included under General Procedures.

Comment: There appears to be no added value for the increased fees since there are no significant improvements in services planned.

Response: The proposed rule package which was published in the *Federal Register* on May 10, 1991, would have adjusted fees to address a 1992 budget of $462 million. This proposed budget included $110 million in increases over the 1991 budget. At an aggregated level, the $110 million increase addressed the following: $30 million for inflation, cost-of-living salary adjustments and other uncontrolled costs; $45 million for increased workload; $18 million for automation initiatives for patents and trademarks; and $17 million for quality enhancements.

Included in the above are improvements in service such as deployment of the Automated Patent System to the public and to the examiners in 1993; improved search services for biotechnology patent examiners; replacement of the automated search system in Trademarks (T-Search); improved management of the patent and trademark operations; enhanced patent classification services; and maintenance of patent and trademark pendency goals.

The PTO currently is in the process of readjusting its 1992 programs and plans to respond to the proposed $426 million program level that is the result of H.R. 3531. While this level is still a significant increase above the 1991 budget, the majority of the increased funds will be used to address inflationary and other uncontrollable costs and workloads. Many of the initiatives proposed under the $462 million level cannot be undertaken in 1992.

Comment: The divergence in charges for recording assignments within a four-year period appears arbitrary, and brings into question the rationale and assumptions used in creating the increase. If owners were to forego the process of recording assignments, PTO records would be incomplete, registration could not be renewed in the name of the true owner, and the patent and trademark systems would suffer. A more viable approach would be to return to a reasonable base fee and a reduction of the fee for subsequent properties.

Response: Trademark assignment fees previously were set at $100 for the first property and $20 for all subsequent properties. The original trademark fee schedule was recommended by Congress, in conjunction with the trademark user community, and was designed to keep the filing fee low and raise certain other fees to recover the costs of the Office. In 1989, the trademark assignment fees were reduced to a flat $8 per property. Although this was the actual unit cost to the Office for processing assignments at that time, it was based on antiquated systems, lengthy processing times and questionable quality. In response to public comments, particularly those from the Public Advisory Committee for Trademark Affairs, fees of $40 for the first trademark property and $25 for all subsequent properties in the same document have been adopted.

A flat $40 per patent property assignment fee is established by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531.

Comment: PCT fees are proposed at disproportionately higher levels than U. S. national fees. This disparity compromises both the spirit of the PCT and its practical effectiveness for users.

Response: Some PCT fees were set by Congress in H.R. 3531. As to the fees for which the Commissioner has been delegated authority to set, these fees have been modified to more accurately reflect the costs of providing the associated services as required by 35 U.S.C. 41(d) as amended by subsection 5(a)(3) of H.R. 3531.

Comment: The omission of small entity reductions for PCT applicants, but not national applicants, discriminates against small entities which use the PCT.

Response: National stage PCT fees have been added to 35 U.S.C. 41(a), therefore making applicants eligible for the small entity reduction.

Comment: The PCT fees for entry into the national stage should be reduced.

Response: PCT fees for entry into the national stage essentially have been set by Congress. The PCT national stage fees are generally at a higher level than U.S. national fees to reflect the increased cost associated with processing national stage applications having multiple inventions which must be processed pursuant to the principle of unity of invention. This difference between national stage fees and national application fees was established at the time of and because of a change in approach to unity of invention

issues as a result of the decision in *Caterpillar Tractor Co. v. Commissioner of Patents and Trademarks*, 650 F. Supp. 218, 231 USPQ 590 (E.D.Va. 1986).

Comment: Fees for PCT applications which include an international advisory search and examination by a foreign patent office effectively penalize rather than recognize the procedural assist.

Response: The content of an international search report or results of a preliminary examination would generally come to the attention of the PTO through an information disclosure statement or through communications from the International Bureau. Where the Japanese Patent Office or European Patent Office provides both the results of the search together with copies of the documents and their pertinence to patentability, these reports have been of assistance to the PTO examiner and are reflected in the new fee.

Comment: As a cost-saving and efficiency measure, the PTO should remove all prescreening of applications and require the examiner to perform any screening needed.

Response: To require patent examiners to perform screening of the formal requirements of the filing of an application would not be efficient or result in cost savings. This screening is performed by clerical personnel in the Application Branch who are paid less than patent examiners and can readily and effectively review a patent application for compliance with formal requirements.

Comment: PTO should remove the statutory change relating to the declaration to avoid the need to staff the Office with trained individuals for reviewing the document. The regulations could be replaced with a mere statement of inventor's name and address provided by the applicant. At the very least, the PTO should allow filing of facsimile copies of declarations at the filing date to avoid the late fee.

Response: The requirement for an oath or declaration is set by statute (35 U.S.C. 115) and is not subject to elimination under the rulemaking authority of the Commissioner. The appropriateness of accepting papers by facsimile has been the subject of a trial program and will be addressed in a future proposal.

Comment: The proposed change which would establish one petition fee amount is reasonable for some petitions and unreasonable for other petitions.

Response: The fee proposed for petitions and other fees are intended to recover the estimated cost of the operations of the PTO. Each petition fee need not, and does not, necessarily recover only the cost of processing and deciding a specific type of petition. Use of one petition fee amount eases the administrative burden on the public and on the PTO of being required to determine the correct fee amount for the particular petition being filed.

Comment: The proposed 50 percent increase in the reexamination fee is too high.

Response: A fee amount of $2,180, which represents a nine percent increase, has been adopted.

Comment: The progressive schedule for the extension-of-time fees is burdensome on a foreign applicant, particularly a small entity. Processing a three-month extension does not require any more effort from PTO than processing a one-month extension.

Response: Extension of time fees are mandated by statute and any increases reflect changes in the CPI as permitted by 35 U.S.C. 41(f) as amended by subsection 5(b) of H.R. 3531.

Comment: The proposed increase in the fee to $300 for late filing of an inventor's oath and/or filing fee might force applicants to delay filing while, for example, obtaining an absent inventor's signature. Public policy to encourage prompt filing--especially important in securing international rights in countries observing strict novelty requirements--suggests the fee be more moderately adjusted.

Response: The adopted fee amount is $130.00 and the small entity subsidy is applicable to surcharge fees for late filing of the basic filing fee or oath or declaration (37 CFR 1.16(e)), for paying a maintenance fee within the six month grace period (37 CFR 1.20(h)), and for filing the basic national fee or oath or declaration later than 20 months in a PCT application (37 CFR 1.492(e)).

Comment: Two respondents expressed opposition to the proposed elimination of the trademark "fence" which, along with stringent public and Congressional oversight, has generally resulted in a fair and reasonable fee schedule. Trademark operations already are 100 percent user-fee funded, and proportionately contributing to PTO overhead costs does not justify the proposed fee increases.

Response: The enacted legislation, H.R. 3531, maintains the "fence" around the use of trademark fees. Trademark fees, however, can be used to fund activities relating to trademarks and to cover a proportionate share of the administrative costs of the PTO.

Comment: The Assistant Commissioner for Trademarks has stated that the actual cost of examining a new trademark application is approximately $225, yet the proposed fee is $250. This could generate a substantial trademark operating surplus which eventually could help underwrite patent operations.

Response: The fee for filing a trademark application has been set at $200. This amount is consistent with the original trademark fee schedule that was recommended by Congress, in conjunction with the trademark user community, to keep the filing fee low and raise certain other fees to recover the costs of the Office.

Comment: The proposed increase in the trademark application filing fee without a corresponding change in Office needs, activities or costs could create a disincentive to Federal registration.

Response: There has been a change in Office needs, activities and costs which justifies the fee increase to $200. As a result of implementation of the Trademark Law Revision Act of 1988, the Office has hired a substantial number of new examining attorneys and other personnel and relocated to new, more appropriate office space. Further, the Office will incur costs connected with the replacement of its current automated search system.

Comment: One respondent questioned PTO's statement in the notice of proposed rulemaking that small entities have the option of not registering their marks under the Federal system, but can choose to use their marks under common law. Deterring applicants from using the Federal registration system will have two additional undesirable consequences. Since fewer trademark owners will apply for registration, the projected revenues may be reduced, thus impairing operations. Second, with declining use of the Federal system, proportionately more trademarks will not be

readily available for searching purposes. Potential trademark owners will face higher risks in adopting and using new marks.

Response: The proposal has been modified to adopt a fee of $200 for filing a trademark application. The referenced statement was made in the section of the proposed rulemaking that addressed the potential impact of the proposed fees on small business. While the PTO does not want to discourage small entities from filing Federal trademark applications, and does not believe that the proposed fee increase will have that effect, the fact remains that trademark rights in the United States are based on actual use of the mark, not on Federal registration. The PTO is cognizant of, and sympathetic to, the concerns expressed in the comment.

Comment: Proposed trademark fees for filing a petition to cancel or a notice of opposition impose an unfair and burdensome penalty on businesses and individuals who wish to protect their rights. Although the base fee of $400 may cover PTO's costs for handling the proceedings, the corresponding fee of $400 for each additional class is not reasonable.

Response: The PTO has amended its proposed rule to indicate the fee for filing a petition to cancel or a notice of opposition will remain at $200 and the charge will still be per class.

Comment: The current practice of charging separate fees for each "opposer" or "petitioner" should be discontinued since it is only one proceeding in the eyes of the PTO with an essential requirement that the opposing/petitioning parties have a unitary interest in the opposition/cancellation proceeding.

Response: This comment is directed at 37 CFR 2.101 and 2.111 which are not the subject of this rulemaking. The PTO will consider this comment the next time it proposes amendments to the Trademark Rules of Practice.

Comment: The proposed increase in the section 8 and 15 affidavit fees could force registrants out of the Federal system. Since section 8 and section 15 affidavits can be filed on the same document, the fee for a combined affidavit should be less than the fees for filing the documents separately, thereby more closely relating to the cost of processing.

Response: The proposed adjustment to section 8 and 15 affidavit fees has not been adopted. Further, it has been a longstanding policy for the PTO to set the fee for a combined section 8 and 15 affidavit at double the fee for either a section 8 affidavit or a section 15 affidavit alone.

Comment: The proposed $200 fee for filing a late renewal is an excessive penalty. The resulting $500 cost of late renewal ($300 renewal fee plus $200 penalty) could cause the abandonment of registrations for marks still in use to the detriment of the registration system.

Response: In response to public comments, the fee for filing a late renewal application remains at $100.

Comment: The proposed fee for obtaining a copy of a trademark file wrapper seems unjustified.

Response: The adopted fee amount of $50 takes into consideration the costs incurred prior to actually copying a file, such as equipment, supplies and staff time necessary to locate and retrieve a file, as well as the copy charge and cost of certification.

Comment: One respondent asked why the PTO is proposing to change the way certification services are provided.

Response: PTO had proposed the change in the present "compare and certify" procedure in order to increase internal controls over services being provided to customers, and thereby enhance the quality of the product ultimately delivered to the customer. PTO is concerned that it have full responsibility for all phases of the processing of certified copies. Although it is quicker and less expensive for the PTO to copy the documents and certify them than to properly compare each document to the original and then certify them, in response to public comments, particularly from patent and trademark services firms, the Office will continue to compare and certify copies made from Office records, but not prepared by PTO staff.

Comment: The proposed rule makes no provision for expedited services for copies of patent or trademark file wrappers and contents.

Response: The PTO cannot guarantee that the file will be located within the shortened period of time required for expedited service.

Comment: There does not appear to be a fee listed for a certified copy of an assignment deed, expedited or otherwise. Will this service be provided?

Response: This service will be provided under 37 CFR 1.19(b)(4). The wording of this rule has been changed to read, "For assignment records, abstract of title and certification, per patent" and covers the provision of certified and uncertified copies of assignment documents as well as certified or uncertified copies of abstracts of title. 37 CFR 2.6(b)(7) also has been changed to clarify the services provided.

Comment: Respondents questioned the basis for the proposed $40 per hour fee for labor. One respondent asked if the $40 per hour fee would apply while a file was being located, say, over a week's time?

Response: The purpose of this fee, which has been adopted at $30, is to set a flat amount for special labor services for which there is no specific fee for the service the customer has requested. This flat labor fee is to complement 37 CFR 1.21(k) which reads "For items and services that the Commissioner finds may be supplied, for which fees are not specified by statute or by this part, such charges as may be determined by the Commissioner with respect to each such item or service."

Comment: Several respondents opposed the proposed reduction from 60 to 30 days for the period of time between publication of a final rule and the effective date.

Response: Subsection 5(c)(1) of H.R. 3531 establishes the requirement that the PTO must publish a final notice in the *Federal Register* and the Patent and Trademark Office *Official Gazette* at least 30 days prior to the effective date of new fee amounts, except for fees set in fiscal year 1992, which go into effect the day after they are published in the *Federal Register.*

Comment: For future publication of proposed rule changes, PTO should return to the previous format of brackets and arrows which explicitly identify language that is added to, or deleted from, the text of a rule.

Response: The PTO followed the accepted procedures of the Office of the Federal Register. In the future, PTO will follow the procedures which, in PTO's judgment, best serve to communicate the proposed changes.

Comment: With the proposed revision to the fee for purchase of coupons, will it still be possible to use the old coupons to purchase copies of patents and trademarks?

Response: Coupons purchased prior to the fee increase and new coupon issuance will continue to be accepted as a means to acquire copies of patents or trademarks. However, the redeemable value of the old coupon issue will be only $1.50. Therefore, for each copy requested, two old coupons or one old coupon plus a $1.50 check or money order must be tendered. Although cash payment is acceptable, checks or money orders are recommended.

OTHER CONSIDERATIONS: The rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354); Executive Orders 12291 and 12612; and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501, et seq. There are no information collection requirements relating to patent and trademark fee rules.

The PTO has determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that the rule change would not have a significant adverse impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354). The principal impact of the major patent fees has already been taken into account in H.R. 3531, which provides small entities with a 50 percent reduction in the major patent fees. Further, the rule change implements the fee amounts set by sections 2(b) and 5(a)(1) of H.R. 3531.

The PTO has determined that this rule change is not a major rule under Executive Order 12291. The annual effect on the economy would be less than $100 million. There would be no major increase in costs or prices for consumers; individual industries; Federal, state, or local government agencies; or geographic regions. There would be no significant adverse effects on competition, employment, investment, productivity, or innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

List of Subjects in 37 CFR

37 CFR Part 1

Administrative practice and procedure, Courts, Freedom of information, Inventions and patents, Reporting and recordkeeping requirements, Small businesses.

37 CFR Part 2

Administrative practice and procedure, Courts, Lawyers, Trademarks.

For the reasons set forth in the preamble, the PTO is amending title 37 of the Code of Federal Regulations, Chapter I, as set forth below.

Part 1-Rules of Practice in Patent Cases

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

Authority: 35 U.S.C. 6, unless otherwise noted.

2. Section 1.12 is amended by revising paragraphs (a) and (d) to read as follows:

§ 1.12 Assignment records open to public inspection.

(a) The assignment records, relating to original or reissue patents, including digests and indexes, and assignment records relating to pending or abandoned trademark applications and to trademark registrations, are open to public inspection, and copies of any instrument recorded may be obtained upon request and payment of the fee set forth in section 1.19(b)(3) and section 2.6(b)(5) of this chapter.

* * * * *

(d) An order for a copy of an assignment should give the identification of the record. If identified only by the name of the patentee and number of the patent, or in the case of a trademark registration by the name of the registrant and number of the registration, or by name of the applicant and serial number or international application number of the application, an extra charge as set forth in section 1.21(j) and section 2.6(b)(10) of this chapter will be made for the time consumed in making a search for such assignment.

3. Section 1.13 is amended by revising paragraph (b) to read as follows:

§ 1.13 Copies and certified copies.

* * * * *

(b) Such copies will be authenticated by the seal of the Patent and Trademark Office and certified by the Commissioner, or in his name attested by an officer of the Patent and Trademark Office authorized by the Commissioner, upon payment of the fee for requesting certified copies of Office documents.

4. Section 1.16 is revised to read as follows:

§ 1.16 National application filing fees.

(a)	Basic fee for filing each application for an original patent, except design or plant cases:		
	By a small entity (§1.9(f))	$345.00	201
	By other than a small entity	$690.00	101
(b)	In addition to the basic filing fee in an original application, for filing or later presentation of each independent claim in excess of 3:		
	By a small entity (§ 1.9(f))	$36.00	202
	By other than a small entity	$72.00	102
(c)	In addition to the basic filing fee in an original application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20. (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes):		
	By a small entity (§ 1.9(f))	$10.00	203
	By other than a small entity	$20.00	103
(d)	In addition to the basic filing fee in an original application, if the application contains, or is amended to contain, a multiple dependent claim(s) per application:		
	By a small entity (§ 1.9(f))	$110.00	204
	By other than a small entity	$220.00	104
	(If the additional fees required by paragraphs (b), (c), and (d) of this section are not paid on filing or on later presentation of the claims for which the additional fees are due, they must be paid or the claims canceled by amendment prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)		
(e)	Surcharge for filing the basic filing fee or oath or declaration on a date later than the filing date of the application:		
	By a small entity (§1.9(f))	$65.00	205
	By other than a small entity	$130.00	105
(f)	For filing each design application:		
	By a small entity (§1.9(f))	$140.00	206
	By other than a small entity	$280.00	106
(g)	Basic fee for filing each plant application:		
	By a small entity (§ 1.9(f))	$230.00	207
	By other than a small entity	$460.00	107
(h)	Basic fee for filing each reissue application:		
	By a small entity (§ 1.9(f))	$345.00	208
	By other than a small entity	$690.00	108

(i)	In addition to the basic filing fee in a reissue application, for filing or later presentation of each independent claim which is in excess of the number of independent claims in the original patent:		
	By a small entity (§ 1.9(f))	$36.00	209
	By other than a small entity	$72.00	109
(j)	In addition to the basic filing fee in a reissue application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 and also in excess of the number of claims in the original patent. (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes):		
	By a small entity (§ 1.9(f))	$10.00	210
	By other than a small entity.	$20.00	110
	(Note: See § 1.445, 1.482 and 1.492 for international application filing and processing fees.)		

5. Section 1.17 is revised to read as follows:

§ 1.17 Patent application processing fees.

(a)	Extension fee for response within first month pursuant to § 1.136(a):		
	By a small entity (§ 1.9(f))	$55.00	215
	By other than a small entity	$110.00	115
(b)	Extension fee for response within second month pursuant to § 1.136(a):		
	By a small entity (§ 1.9(f))	$175.00	216
	By other than a small entity	$350.00	116
(c)	Extension fee for response within third month pursuant to § 1.136(a):		
	By a small entity (§ 1.9(f))	$405.00	217
	By other than a small entity	$810.00	117
(d)	Extension fee for response within fourth month pursuant to § 1.136(a):		
	By a small entity (§ 1.9(f))	$640.00	218
	By other than a small entity	$1,280.00	118
(e)	For filing a notice of appeal from the examiner to the Board of Patent Appeals and Interferences:		
	By a small entity (§ 1.9(f))	$130.00	219
	By other than a small entity	$260.00	119
(f)	In addition to the fee for filing a notice of appeal, for filing a brief in support of an appeal:		
	By a small entity (§ 1.9(f))	$130.00	220
	By other than a small entity	$260.00	120

(g) For filing a request for an oral hearing before the Board of Patent Appeals and Interferences in appeal under 35 U.S.C. 134:
By a small entity (§ 1.9(f)) $110.00 221
By other than a small entity $220.00 121

(h) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph $130.00 122
§ 1.47 - for filing by other than all the inventors or a person not the inventor.
§ 1.48 - for correction of inventorship.
§ 1.182 - for decision on questions not specifically provided for.
§ 1.183 - to suspend the rules.
§ 1.295 - for review of refusal to publish a statutory invention registration.
§ 1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of patent.
§ 1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in expired patent.
§ 1.644(e) - for petition in an interference.
§ 1.644(f) - for request for reconsideration of a decision on petition in an interference.
§ 1.666(c) - for late filing of interference settlement agreement.
§§ 5.12, 5.13, & 5.14 - for expedited handling of foreign filing license.
§ 5.15 - for changing the scope of a license.
§ 5.25 - for retroactive license.

(i) (1) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph $130.00 122
§ 1.12 - for access to an assignment record.
§ 1.14 - for access to an application.
§ 1.53 - to accord a filing date.
§ 1.55 - for entry of late priority papers.
§ 1.60 - to accord a filing date.
§ 1.62 - to accord a filing date.
§ 1.103 - to suspend action in application.
§ 1.177 - for divisional reissues to issue separately.
§ 1.312 - for amendment after payment of issue fee.
§ 1.313 - to withdraw an application from issue.
§ 1.314 - to defer issuance of a patent.
§ 1.334 - for patent to issue to assignee, assignment recorded late.
§ 1.666(b) - for access to interference settlement agreement.

(2) For filing a petition to the Commissioner under § 1.102 of this part to make application special $130.00 122

(j) For filing a petition to institute a public use proceeding under § 1.292 ..... $1,310.00 138

(k) For processing an application filed with a specification in a non-English language (§ 1.52(d)) $130.00 139

(l) For filing a petition:
(1) For the revival of an unavoidably abandoned application under 35 U.S.C. sections 111, 133 , 364, or 371, or
(2) For delayed payment of the issue fee under 35 U.S.C. 151:
By a small entity (§ 1.9(f)).....$55.00 240
By other than a small entity.....$110.00 140

(m) For filing a petition:
(1) For revival of an unintentionally abandoned application, or
(2) For the unintentionally delayed payment of the fee for issuing a patent:
By a small entity (§ 1.9(f)).....$565.00 241
By other than a small entity.....$1,130.00 141

(n) For requesting publication of a statutory invention registration prior to the mailing of the first examiner's action pursuant to § 1.104--$790.00 reduced by the amount of the application basic filing fee paid 112

(o) For requesting publication of a statutory invention registration after the mailing of the first examiner's action pursuant to § 1.104--$1,580.00 reduced by the amount of the application basic filing fee paid 113

6. Section 1.18 is revised to read as follows:

§ 1.18 Patent issue fees.

(a) Issue fee for issuing each original or reissue patent, except a design or plant patent:
By a small entity (§ 1.9(f)).....$565.00 242
By other than a small entity.....$1,130.00 142

(b) Issue fee for issuing a design patent:
By a small entity (§ 1.9(f)).....$200.00 243
By other than a small entity.....$400.00 143

(c) Issue fee for issuing a plant patent:
By a small entity (§ 1.9(f)).....$285.00 244
By other than a small entity.....$570.00 144

Section 1.19 is revised to read as follows:

§ 1.19 Document supply fees.

The Patent and Trademark Office will supply copies of the following documents upon payment of the fees indicated:

(a) Uncertified copies of patents:
(1) Printed copy of a patent, including a design patent, statutory invention registration, or defensive

publication document, except patent or statutory invention registration containing color drawing:

(i) Regular service	$3.00	561
(ii) Expedited local service	$6.00	562
(iii) Expedited service for copy ordered by electronic ordering service and delivered to the customer within two workdays	$25.00	563
(2) Printed copy of a plant patent in color	$12.00	564
(3) Copy of a utility patent or statutory invention registration containing color drawing (see § 1.84(p))	$24.00	565

(b) Certified and uncertified copies of Office documents:

(1) Certified or uncertified copy of patent application as filed		
(i) Regular service	$12.00	566
(ii) Expedited local service	$24.00	567
(2) Certified or uncertified copy of patent-related file wrapper and contents	$150.00	568
(3) Certified or uncertified copies of Office records, per document except as otherwise provided in this section	$25.00	569
(4) For assignment records, abstract of title and certification, per patent	$20.00	570
(c) Library service (35 U.S.C. 13): For providing to libraries copies of all patents issued annually, per annum	$50.00	571
(d) For list of all United States patents and statutory invention registrations in a subclass	$3.00	572
(e) Uncertified statement as to status of the payment of maintenance fees due on a patent or expiration of a patent	$10.00	573
(f) Uncertified copy of a non-United States patent document, per document	$12.00	574
(g) To compare and certify copies made from Patent and Trademark Office records, but not prepared by the Patent and Trademark Office, per copy of document	$25.00	575
(h) Additional filing receipts; duplicate; or corrected due to applicant error	$20.00	576

8. Section 1.20 is revised to read as follows:

§ 1.20 Post issuance fees.

(a) For providing a certificate of correction for applicant's mistake (§ 1.323)	$70.00	145
(b) Petition for correction of inventorship in patent (§ 1.324)	$130.00	122

(c) For filing a request for reexamination (§1.510(a))	$2,180.00	147
(d) For filing each statutory disclaimer (§ 1.321):		
By a small entity (§ 1.9(f))	$55.00	248
By other than a small entity	$110.00	148
(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond four years; the fee is due by three years and six months after the original grant		
By a small entity (§ 1.9(f))	$450.00	283
By other than a small entity	$900.00	183
(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond eight years; the fee is due by seven years and six months after the original grant		
By a small entity (§ 1.9(f))	$905.00	284
By other than a small entity	$1,810.00	184
(g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after December 12, 1980, in force beyond twelve years; the fee is due by eleven years and six months after the original grant		
By a small entity (§ 1.9(f))	$1,365.00	285
By other than a small entity	$2,730.00	185
(h) Surcharge for paying a maintenance fee during the six-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after December 12, 1980		
By a small entity (§ 1.9(f))	$65.00	
By other than a small entity	$130.00	
(i) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable	$600.00	187
(j) For filing an application for extension of the term of a patent (§ 1.740)	$1,000.00	111

9. Section 1.21 is revised to read as follows:

§ 1.21 Miscellaneous fees and charges.

The Patent and Trademark Office has established the following fees for the services indicated:

(a)	Registration of attorneys and agents:		
(1)	For admission to examination for registration to practice, fee payable upon application	$290.00	609
(2)	On registration to practice	$100.00	610
(3)	For reinstatement to practice	$15.00	611
(4)	For certificate of good standing as an attorney or agent	$10.00	612
	Suitable for framing	$20.00	613
(5)	For review of a decision of the Director of Enrollment and Discipline under § 10.2(c)	$120.00	615
(6)	For requesting regrading of an examination under §10.7(c)	$120.00	616
(b)	Deposit accounts:		
(1)	For establishing a deposit account	$10.00	607
(2)	Service charge for each month when the balance at the end of the month is below $1,000.	$20.00	608
(3)	Service charge for each month when the balance at the end of the month is below $300 for restricted subscription deposit accounts used exclusively for subscription order of patent copies as issued	$20.00	608
(c)	Disclosure document: For filing a disclosure document	$10.00	577
(d)	Delivery box: Local delivery box rental, per annum	$50.00	578
(e)	International type search reports: For preparing an international type search report of an international type search made at the time of the first action on the merits in a national patent application	$35.00	579
(f)	[Reserved]		
(g)	Self-service copy charge, per page	$0.25	580
(h)	For recording each assignment, agreement or other paper relating to the property in a patent or application, per property	$40.00	581
(i)	Publication in Official Gazette: For publication in the Official Gazette of a notice of the availability of an application or a patent for licensing or sale, each application or patent	$20.00	583
(j)	Labor charges for services, per hour or fraction thereof	$30.00	584

(k)	For items and services that the Commissioner finds may be supplied, for which fees are not specified by statute or by this part, such charges as may be determined by the Commissioner with respect to each such item or service	Actual Cost	585
(l)	For processing and retaining any application abandoned pursuant to section 1.53(d) unless the required basic filing fee has been paid	$130.00	586
(m)	For processing each check returned "unpaid" by a bank	$50.00	617
(n)	For handling an incomplete or improper application under § 1.53(c), § 1.60 or § 1.62	$130.00	587
(o)	Marginal cost, paid in advance, for each hour of terminal session time, including print time, using Automated Patent System full-text search capabilities, prorated for the actual time used. The Commissioner may waive the payment by an individual for access to the Automated Patent System full-text search capability (APS-Text) upon a showing of need or hardship, and if such waiver is in the public interest	$40.00	588

10. Section 1.24 is revised to read as follows:

§ 1.24 Coupons.

Coupons in denominations of three dollars, for the purchase of patents, designs, defensive publications, statutory invention registrations, and trademark registrations are sold by the Patent and Trademark Office for the convenience of the general public; these coupons may not be used for any other purpose. The three-dollar coupons are sold individually and in books of 50 for $150.00. These coupons are good until used; they may be transferred but cannot be redeemed.490/590

11. Section 1.26 is amended by revising paragraph (c) to read as follows:

§ 1.26 Refunds.

* * * * *

(c) If the Commissioner decides not to institute a reexamination proceeding, a refund of $1,635 will be made to the requester of the proceeding. Reexamination requesters should indicate whether any refund should be made by check or by credit to a deposit account.

12. Section 1.171 is revised to read as follows:

§ 1.171 Application for reissue.

An application for reissue must contain the same parts required for an application for an original patent, complying with all the rules relating thereto except as otherwise provided, and, in addition, must comply with the requirements of the rules relating to reissue applications. The

application must be accompanied by a certified copy of an abstract of title or an order for a title report accompanied by the fee set forth in § 1.19(b)(4) to be placed in the file, and by an offer to surrender the original patent (§ 1.178).

13. Section 1.296 is revised to read as follows:

§ 1.296 Withdrawal of request for publication of statutory invention registration.

A request for a statutory invention registration, which has been filed, may be withdrawn prior to the date of the notice of the intent to publish a statutory invention registration issued pursuant to § 1.294(c) by filing a request to withdraw the request for publication of a statutory invention registration. The request to withdraw may also include a request for a refund of any amount paid in excess of the application filing fee and a handling fee of $130.00 which will be retained. Any request to withdraw the request for publication of a statutory invention registration filed on or after the date of the notice of intent to publish issued pursuant to § 1.294(c) must be in the form of a petition pursuant to § 1.183 accompanied by the fee set forth in § 1.17(h).

14. Section 1.362 is amended by revising paragraphs (a), (b) and (e) to read as follows:

§ 1.362 Time for payment of maintenance fees.

(a) Maintenance fees as set forth in § 1.20(e) through (g) are required to be paid in all patents based on applications filed on or after December 12, 1980, except as noted in paragraph (b) of this section, to maintain a patent in force beyond 4, 8 and 12 years after the date of grant.

(b) Maintenance fees are not required for any plant patents or for any design patents. Maintenance fees are not required for a reissue patent if the patent being reissued did not require maintenance fees.

* * * * *

(e) Maintenance fees may be paid with the surcharge set forth in § 1.20(h) during the respective grace periods after:
(1) 3 years through 3 years and 6 months after grant for the first maintenance fee,
(2) 7 years through 7 years and 6 months after grant for the second maintenance fee, and
(3) 11 years through 11 years and 6 months after grant for the third maintenance fee.

* * * * *

15. Section 1.378 is amended by revising paragraphs (a), (b), (c)(1) and (2), and (e) to read as follows:

§ 1.378 Acceptance of delayed payment of maintenance fee in expired patent to reinstate patent.

(a) The Commissioner may accept the payment of any maintenance fee due on a patent after expiration of the patent if, upon petition, the delay in payment of the maintenance fee is shown to the satisfaction of the Commissioner to have been unavoidable and if the surcharge required by § 1.20(i) is paid as a condition of accepting payment of the maintenance fee. If the Commissioner accepts payment of the maintenance fee upon petition, the patent shall be considered as not having expired, but will be subject to the conditions set forth in 35 U.S.C. 41(c)(2).

(b) Any petition to accept the delayed payment of a maintenance fee filed under paragraph (a) of this section within six months of the expiration of the patent must include:
(1) The required maintenance fee set forth in § 1.20(e)-(g);
(2) The surcharge set forth in § 1.20(i); and
(3) A showing that the delay was unavoidable since reasonable care was taken to ensure that the maintenance fee would be paid timely. The showing must enumerate the steps taken to ensure timely payment of the maintenance fee.

(c) Any petition to accept the delayed payment of a maintenance fee filed under paragraph (a) of this section more than six months after the expiration of the patent must include:
(1) The required maintenance fee set forth in § 1.20(e)-(g),
(2) The surcharge set forth in § 1.20(i); and

* * * * *

(e) Reconsideration of a decision refusing to accept a maintenance fee upon petition filed pursuant to paragraph (a) of this section may be obtained by filing a petition for reconsideration within two months of, or such other time as set in, the decision refusing to accept the delayed payment of the maintenance fee. Any such petition for reconsideration must be accompanied by the petition fee set forth in § 1.17(h). After decision on the petition for reconsideration, no further reconsideration or review of the matter will be undertaken by the Commissioner. If the delayed payment of the maintenance fee is not accepted, the maintenance fee and the surcharge set forth in § 1.20(i) will be refunded following the decision on the petition for reconsideration, or after the expiration of the time for filing such a petition for reconsideration, if none is filed. The fee set forth in § 1.17(h) for filing the petition for reconsideration will not be refunded unless the refusal to accept and record the maintenance fee is determined to result from an error by the Patent and Trademark Office.

16. Section 1.445 is amended by revising paragraph (a) to read as follows:

§ 1.445 International application filing, processing and search fees.

(a) The following fees and charges for international applications are established by the Commissioner under the authority of 35 U.S.C. 376:

(1) A transmittal fee (see 35 U.S.C. 361(d) and PCT Rule 14) $190.00 150

(2) A search fee (see 35 U.S.C. 361(d) and PCT Rule 16) where:

(i) No corresponding prior United States national application with basic filing fee has been filed..... $600.00 151

(ii) A corresponding prior United States national application with basic filing fee has been filed..... $400.00 153

(3) A supplemental search fee when required, per additional invention..... $160.00 152

* * * * *

17. Section 1.482 is amended by revising paragraph (a) to read as follows:

§ 1.482 International preliminary examination fees.

(a) The following fees and charges for international preliminary examination are established by the Commissioner under the authority of 35 U.S.C. 376:

(1) A preliminary examination fee is due on filing the Demand:

(i) Where an international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority, a preliminary examination fee of $440.00 190

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office, a preliminary examination fee of..... $650.00 191

(2) An additional preliminary examination fee when required, per additional invention:

(i) Where a supplemental search fee as set forth in § 1.445(a)(3) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority..... $140.00 192

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office $220.00 193

* * * * *

18. Section 1.492 is revised to read as follows:

§ 1.492 National stage fees.

The following fees and charges for international applications entering the national stage under 35 U.S.C. 371 are established by the Commissioner under 35 U.S.C. 376:

(a) The basic national fee:

(1) Where an international preliminary examination fee as set forth in § 1.482 has been paid on the international application to the United States Patent and Trademark Office:
By a small entity (§ 1.9(f)) $310.00 957
By other than a small entity. $620.00 956

(2) Where no international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office, but an international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority:
By a small entity (§ 1.9(f)) $345.00 959
By other than a small entity $690.00 958

(3) Where no international preliminary examination fee as set forth in § 1.482 has been paid and no international search fee as set forth in § 1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office:
By a small entity (§ 1.9(f)) $460.00 961
By other than a small entity $920.00 960

(4) Where the international preliminary examination fee as set forth in § 1.482 has been paid to the United States Patent and Trademark Office and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness), and industrial applicability, as defined in PCT Article 33 (1) to (4) have been satisfied for all the claims presented in the application entering the national stage (see § 1.496(b)):
By a small entity (§ 1.9(f)) $45.00 963
By other than a small entity $90.00 962

(5) Where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office:

By a small entity (§ 1.9(f))	$400.00	970
By other than a small entity	$800.00	971

(b) In addition to the basic national fee, for filing or later presentation of each independent claim in excess of 3:

By a small entity (§ 1.9(f))	$36.00	965
By other than a small entity	$72.00	964

(c) In addition to the basic national fee, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes.):

By a small entity (§ 1.9(f))	$10.00	967
By other than a small entity	$20.00	966

(d) In addition to the basic national fee, if the application contains, or is amended to contain, a multiple dependent claims(s), per application:

By a small entity (§ 1.9(f))	$110.00	968
By other than a small entity	$220.00	968

(If the additional fees required by paragraphs (b), (c), and (d) are not paid on presentation of the claims for which the additional fees are due, they must be paid or the claims cancelled by amendment prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

(e) Surcharge for filing the basic national fee or oath or declaration later than 20 months from the priority date pursuant to § 1.494(c) or later than 30 months from the priority date pursuant to § 1.495(c):

By a small entity (§ 1.9(f))	$65.00	
By other than a small entity.	$130.00	

(f) For filing an English translation of an international application later than 20 months after the priority date (§ 1.494(c)) or filing an English translation of the international application or of any annexes to the international preliminary examination report later than 30 months after the priority date (§ 1.495(c) and (e)) $130.00 156

19. Section 1.740 is amended by revising paragraph (a)(14) to read as follows:

§ 1.740 Application for extension of patent term.

(a)* * *

(14) The prescribed fee for receiving and acting upon the application for extension (see § 1.20(j)).

* * * * *

20. Section 1.770 is revised to read as follows:

§ 1.770 Express withdrawal of application for extension of patent term.

An application for extension of patent term may be expressly withdrawn before a determination is made pursuant to § 1.750 by filing in the Office, in duplicate, a written declaration of withdrawal signed by the owner of record of the patent or its agent. An application may not be expressly withdrawn after the date permitted for response to the final determination on the application. An express withdrawal pursuant to this section is effective when acknowledged in writing by the Office. The filing of an express withdrawal pursuant to this section and its acceptance by the Office does not entitle applicant to a refund of the filing fee (§ 1.20(j)) or any portion thereof.

Part 2 - Rules of Practice in Trademark Cases

1. The authority citation for Part 2 continues to read as follows:

Authority: 15 U.S.C. 1123; 35 U.S.C. 6, unless otherwise noted.

2. Section 2.6 is revised to read as follows:

§ 2.6 Trademark fees.

The following fees and charges are established by the Patent and Trademark Office for trademark cases:

(a) Trademark process fees.

(1) For filing an application, per class	$200.00	361
(2) For filing an amendment to allege use under section 1(c) of the Act, per class	$100.00	362
(3) For filing a statement of use under section 1(d)(1) of the Act, per class	$100.00	363
(4) For filing a request under section 1(d)(2) of the Act for a six-month extension of time for filing a statement of use under section 1(d)(1) of the Act, per class	$100.00	364
(5) For filing an application for renewal of a registration, per class	$300.00	365
(6) Additional fee for filing a renewal application made within three months after the expiration of the registration, per class	$100.00	366
(7) For filing to publish a mark under section 12(c), per class	$100.00	367
(8) For issuing a new certificate of registration upon request of assignee	$100.00	368
(9) For a certificate of correction of registrant's error	$100.00	369
(10) For filing a disclaimer to a registration	$100.00	370
(11) For filing an amendment to a registration	$100.00	371
(12) For filing an affidavit under § 8 of the Act, per class	$100.00	372
(13) For filing an affidavit under § 15 of the Act, per class	$100.00	373
(14) For filing a combined affidavit under §§ 8 and 15 of the Act, per class	$200.00	374

(15) For petitions to the Commissioner	$100.00	375
(16) For filing a petition to cancel, per class	$200.00	376
(17) For filing a notice of opposition, per class	$200.00	377
(18) For ex parte appeal to the Trademark Trial and Appeal Board, per class	$100.00	378

(b) Trademark service fees.

(1) For printed copy of registered mark, copy only		
(i) Regular service	$3.00	461
(ii) Expedited local service	$6.00	462
(iii) Expedited service for copy ordered by electronic ordering service and delivered to the customer within two work days	$25.00	463
(2) Certified or uncertified copy of trademark application as filed:		
(i) Regular service	$12.00	466
(ii) Expedited local service	$24.00	467
(3) Certified or uncertified copy of a trademark-related file wrapper and contents	$50.00	468
(4) Certified copy of a registered mark, showing title and/or status:		
(i) Regular service	$10.00	464
(ii) Expedited local service	$20.00	465
(5) Certified or uncertified copy of trademark records, per document except as otherwise provided in this section	$25.00	469
(6) For recording each trademark assignment, agreement or other paper relating to the property in a registration or application		
(i) First property in a document	$40.00	481
(ii) For each additional property in the same document	$25.00	482
(7) For assignment records, abstract of title and certification, per registration	$20.00	470
(8) Marginal cost, paid in advance, for each hour of terminal session time, including print time, using T-Search capabilities, prorated for the actual time used. The Commissioner may waive the payment by an individual for access to T-Search upon a showing of need or hardship, and if such waiver is in the public interest	$40.00	488
(9) Self-service copy charge, per page	$0.25	480

(10) Labor charges for services, per hour or fraction thereof	$30.00	484
(11) For items and services that the Commissioner finds may be supplied, for which fees are not specified by statute or by this part, such charges as may be determined by the Commissioner with respect to each such item or service	Actual Cost	485

Date

Harry F. Manbeck, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks

NOTE - The following appendix will not appear in the Code of Federal Regulations

Patent Cooperation Treaty Update

The International Bureau of the World Intellectual Property Organization has informed the U.S. Patent and Trademark Office that, due to a decision of the Assembly of the PCT Union taken during its meeting from 23 September 1991 to 02 October 1991, the amount of the international fees for international applications will increase, effective 01 January 1992.

Effective 01 January 1992, the amount of the international fees for international applications filed in the United States Receiving Office will be:

Basic fee (first 30 pages)	$525.00
Basic Supplemental fee (for each page over 30)	$10.00
Designation fee (per country or region up to 10)	$127.00
Handling fee	$161.00

The fees charged by the U.S. Patent and Trademark Office, including PCT fees other than those listed above, are adjusted on December 16, 1991 except for fees set under 37 CFR 1.445(a) and 1.482(a) which will be effective on December 27, 1991. (Refer to Appendix B for specific effective dates).

NOTE - The following appendix will not appear in the Code of Federal Regulations

Patent Cooperation Treaty (PCT) Information

For information concerning PCT member countries, see the notice appearing in the *Official Gazette* at 1126 O.G. 2, on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52, on September 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2, on July 7, 1987, and at 1091 O.G. 2, on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed on July 1, 1991, due to a difference in the exchange rate of the U.S. dollar in relation to the German mark, and was announced in the *Official Gazette* at 1126 O.G. 76, on May 28, 1991.

International fees will be changed on January 1, 1992, due to a decision of the Assembly of the PCT Union taken during its meeting from 23 September 1991 to 02 October 1991, as described below under "International fees."

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective [Insert one day after publication in the Federal Register], as described below under "U.S. National Stage fees."

The current schedule of PCT fees (in U.S. dollars) is as follows:

		Effective Date
Transmittal fee	$190.00	*
Search Fee		
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)		
- No corresponding prior U.S. national application filed	$600.00	12/27/91
- Corresponding prior U. S . national application filed	$400.00	12/27/91
- Supplemental search fee, per additional invention	$160.00	12/27/91
European Patent Office as ISA	$1320.00	8/1/91

NOTE - The following appendix will not appear in the Code of Federal Regulations

		Effective Date
Preliminary examination fee		
USPTO as International Preliminary Examining Authority (IPEA)		
- Search fee paid to USPTO as ISA	$440.00	12/27/91
- Additional examination fee, per additional invention	$140.00	12/27/91
- ISA not the USPTO	$650.00	12/27/91
- Additional examination fee, per additional invention	$220.00	12/27/91
International fees		
Basic fee	$525.00	1/1/92
Basic Supplemental fee (for each page over 30)	$10.00	1/1/92
Designation fee per country or region for the first 10 national or regional offices	$127.00	1/1/92
Designation fee for 11th and subsequent designations	No Charge	1/1/92
Handling fee	$161.00	1/1/92

U.S. National Stage fees	Small Entity	Regular	Effective Date
USPTO was IPEA	$310.00	$620.00	*
USPTO was ISA but not IPEA	$345.00	$690.00	*
USPTO was neither ISA nor IPEA	$460.00	$920.00	*
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	$45.00	$90.00	*
- For each independent claim in excess of 3	$36.00	$72.00	*
- For each claim in excess of 20	$10.00	$20.00	*
- For each application containing a multiple dependent claim	$110.00	$220.00	*
- Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	$65.00	$130.00	*
- Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	$130.00	$130.00	*
- For filing with EPO/JPO search report	$400.00	$800.00	*

* The effective date is December 16, 1991.

NOTE.- The following appendix will not appear in the Code of Federal Regulations.

Comparison of Existing and Final Fee Amounts

37 CFR Section			FEE AMOUNT		
Final	Existing	DESCRIPTION	Apr 17 1989	Nov 5 1990	December 1991
1.16(a)	1.16(a)	Basic Filing Fee	$370	$630	$690
1.16(a)	1.16(a)	Basic Filing Fee (Small Entity)	$185	$315	$345
1.16(b)	1.16(b)	Independent Claims	$36	$60	$72
1.16(b)	1.16(b)	Independent Claims (Small Entity)	$18	$30	$36
1.16(c)	1.16(c)	Claims in Excess of 20	$12	$20	$20
1.16(c)	1.16(c)	Claims in Excess of 20 (Small Entity)	$6	$10	$10
1.16(d)	1.16(d)	Multiple Dependent Claims	$120	$200	$220
1.16(d)	1.16(d)	Multiple Dependent Claims (Small Entity)	$60	$100	$110
1.16(e)	1.16(e)	Surcharge - Late Filing Fee	$120	—	$130
1.16(e)	1.16(e)	Surcharge - Late Filing Fee (Small Entity)	$60	—	$65
1.16(f)	1.16(f)	Design Filing Fee	$150	$250	$280
1.16(f)	1.16(f)	Design Filing Fee (Small Entity)	$75	$125	$140
1.16(g)	1.16(g)	Plant Filing Fee	$250	$420	$460
1.16(g)	1.16(g)	Plant Filing Fee (Small Entity)	$125	$210	$230
1.16(h)	1.16(h)	Reissue Filing Fee	$370	$630	$690
1.16(h)	1.16(h)	Reissue Filing Fee (Small Entity)	$185	$315	$345
1.16(i)	1.16(i)	Reissue Independent Claims	$36	$60	$72
1.16(i)	1.16(i)	Reissue Independent Claims (Small Entity)	$18	$30	$36
1.16(j)	1.16(j)	Reissue Claims in Excess of 20	$12	$20	$20
1.16(j)	1.16(j)	Reissue Claims in Excess of 20 (Small Entity)	$6	$10	$10
1.17(a)	1.17(a)	Extension - First Month	$62	$100	$110
1.17(a)	1.17(a)	Extension - First Month (Small Entity)	$31	$50	$55
1.17(b)	1.17(b)	Extension - Second Month	$180	$300	$350
1.17(b)	1.17(b)	Extension - Second Month (Small Entity)	$90	$150	$175
1.17(c)	1.17(c)	Extension - Third Month	$430	$730	$810
1.17(c)	1.17(c)	Extension - Third Month (Small Entity)	$215	$365	$405
1.17(d)	1.17(d)	Extension - Fourth Month	$680	$1,150	$1,280
1.17(d)	1.17(d)	Extension - Fourth Month (Small Entity)	$340	$575	$640
1.17(e)	1.17(e)	Notice of Appeal	$140	$240	$260
1.17(e)	1.17(e)	Notice of Appeal (Small Entity)	$70	$120	$130
1.17(f)	1.17(f)	Filing a Brief	$140	$240	$260
1.17(f)	1.17(f)	Filing a Brief (Small Entity)	$70	$120	$130
1.17(g)	1.17(g)	Request for Oral Hearing	$120	$200	$220
1.17(g)	1.17(g)	Request for Oral Hearing (Small Entity)	$60	$100	$110
1.17(h)	1.17(h)	Petition - Not All Inventors	$120	—	$130
1.17(h)	1.17(h)	Petition - Correction of Inventorship	$120	—	$130
1.17(h)	1.17(h)	Petition - Decision on Questions	$120	—	$130
1.17(h)	1.17(h)	Petition - Suspend Rules	$120	—	$130
1.17(h)	1.17(h)	Petition - Expedited License	$120	—	$130
1.17(h)	1.17(h)	Petition - Scope of License	$120	—	$130
1.17(h)	1.17(h)	Petition - Retroactive License	$120	—	$130
1.17(h)	1.17(h)	Petition - Refusing Maintenance Fee	$120	—	$130
1.17(h)	1.17(h)	Petition - Refusing Maintenance Fee - Expired Patent	$120	—	$130
1.17(h)	1.17(h)	Petition - Interference	$120	—	$130
1.17(h)	1.17(h)	Petition - Reconsider Interference	$120	—	$130
1.17(h)	1.17(h)	Petition - Late Filing of Interference	$120	—	$130
1.17(h)	1.17(h)	Petition - Refusal to Publish SIR	$120	—	$130

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

Comparison of Existing and Final Fee Amounts

37 CFR Section			FEE AMOUNT		
Final	Existing	DESCRIPTION	Apr 17 1989	Nov 5 1990	December 1991
1.17(i)(1)	1.17(i)(1)	Petition - For Assignment	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - For Application	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Late Priority Papers	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Suspend Action	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Divisional Reissues to Issue Separately	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - For Interference Agreement	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Amendment After Issue	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Withdrawal After Issue	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Defer Issue	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Issue to Assignee	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Accord a Filing Date Under §1.53	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Accord a Filing Date Under §1.60	$120	---	$130
1.17(i)(1)	1.17(i)(1)	Petition - Accord a Filing Date Under §1.62	$120	---	$130
1.17(i)(2)	1.17(i)(2)	Petition - Make Application Special	$80	---	$130
1.17(j)	1.17(j)	Petition - Public Use Proceeding	$1,200	---	$1,310
1.17(k)	1.17(k)	Non-English Specification	$30	---	$130
1.17(l)	1.17(l)	Petition - Revive Abandoned Appl.	$62	$100	$110
1.17(l)	1.17(l)	Petition - Revive Abandoned Appl. (Small Entity)	$31	$50	$55
1.17(m)	1.17(m)	Petition - Revive Unintentionally Abandoned Appl.	$620	$1,050	$1,130
1.17(m)	1.17(m)	Petition - Revive Unintent Abandoned Appl. (Small Entity)	$310	$525	$565
1.17(n)	1.17(n)	SIR - Prior to Examiner's Action	$400	---	$790
1.17(o)	1.17(o)	SIR - After Examiner's Action	$800	---	$1,580
1.18(a)	1.18(a)	Issue Fee	$620	$1,050	$1,130
1.18(a)	1.18(a)	Issue Fee (Small Entity)	$310	$525	$565
1.18(b)	1.18(b)	Design Issue Fee	$220	$370	$400
1.18(b)	1.18(b)	Design Issue Fee (Small Entity)	$110	$185	$200
1.18(c)	1.18(c)	Plant Issue Fee	$310	$520	$570
1.18(c)	1.18(c)	Plant Issue Fee (Small Entity)	$155	$260	$285
1.19(a)(1)(i)	1.19(a)(1)	Copy of Patent	$1.50	---	$3
1.19(a)(1)(ii)	1.19(a)(5)	Patent Copy - Expedited Local Service	$3	---	$6
1.19(a)(1)(iii)	1.19(a)(6)	Patent Copy Ordered Via EOS - Expedited Service	$25	---	$25
1.19(a)(2)	1.19(a)(2)	Plant Patent Copy	$10	---	$12
1.19(a)(3)(i)	1.19(a)(4)	Copy of Utility Patent or SIR in Color	$20	---	$24
1.19(b)(1)(i)	1.19(b)(1)	Certified Copy of Patent Application as Filed	$10	---	$12
1.19(b)(1)(i)	1.19(b)(4)	Certified Copy of Patent Application as Filed, Expedited	$20	---	$24
1.19(b)(2)	1.19(b)(2)	Cert or Uncert Copy of Patent-Related File Wrapper/Contents	$170	---	$150
1.19(b)(3)	1.19(b)(5)	Cert. or Uncert. Copies of Office Records, per Document	$3	---	$25
1.19(b)(4)	1.19(b)(6)	For Assignment Records, Abstract of Title and Certification	$15	---	$20
1.19(c)	1.19(c)	Library Service	$50	---	$50
1.19(d)	1.19(d)	List of Patents in Subclass	$2	---	$3
1.19(e)	1.19(e)	Uncertified Statement - Status of Maintenance Fee Payment	$5	---	$10
1.19(f)	1.19(f)	Copy of Non-U.S. Patent Document	$10	---	$12
1.19(g)	1.19(g)	Comparing and Certifying Copies, Per Document, Per Copy	$10	---	$25
1.19(h)	1.19(h)	Duplicate or Corrected Filing Receipt	$15	---	$20
1.20(a)	1.20(a)	Certificate of Correction	$60	---	$70
1.20(b)	1.20(b)	Petition - Correction of Inventorship	$120	---	$130
1.20(c)	1.20(c)	Reexamination	$2,000	---	$2,180
1.20(d)	1.20(d)	Statutory Disclaimer	$62	$100	$110
1.20(d)	1.20(d)	Statutory Disclaimer (Small Entity)	$31	$50	$55

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

Comparison of Existing and Final Fee Amounts

37 CFR Section			FEE AMOUNT		
Final	Existing	DESCRIPTION	Apr 17 1989	Nov 5 1990	December 1991
1.20(e)		Maintenance Fee - 3.5 Years	*	*	$900
1.20(e)		Maintenance Fee - 3.5 Years (Small Entity)		*	$450
1.20(f)		Maintenance Fee - 7.5 Years		*	$1,810
1.20(f)		Maintenance Fee - 7.5 Years (Small Entity)		*	$905
1.20(g)		Maintenance Fee - 11.5 Years		*	$2,730
1.20(g)		Maintenance Fee - 11.5 Years (Small Entity)		*	$1,365
1.20(h)		Surcharge - Maintenance Fee - 6 Months	**	---	$130
1.20(h)		Surcharge - Maintenance Fee - 6 Months (Small Entity)	**	---	$65
1.20(i)	1.20(m)	Surcharge - Maintenance After Expiration	$550	---	$600
1.20(j)	1.20(n)	Extension of Term of Patent	$600	---	$1,000
1.21(a)(1)	1.21(a)(1)	Admission to Examination	$270	---	$290
1.21(a)(2)	1.21(a)(2)	Registration to Practice	$90	---	$100
1.21(a)(3)	1.21(a)(3)	Reinstatement to Practice	$10	---	$15
1.21(a)(4)	1.21(a)(4)	Certificate of Good Standing	$10	---	$10
1.21(a)(4)	1.21(a)(4)	Certificate of Good Standing, Suitable Framing	$100	---	$20
1.21(a)(5)	1.21(a)(5)	Review of Decision of Director, OED	$100	---	$120
1.21(a)(6)	1.21(a)(6)	Regrading of Examination	$100	---	$120
1.21(b)(1)	1.21(b)(1)	Establish Deposit Account	$10	---	$10
1.21(b)(2)	1.21(b)(2)	Service Charge Below Minimum Balance	$20	---	$20
1.21(b)(3)	1.21(b)(3)	Service Charge Below Minimum Balance	$20	---	$20
1.21(c)	1.21(c)	Filing a Disclosure Document	$6	---	$10
1.21(d)	1.21(d)	Box Rental	$50	---	$50
1.21(e)	1.21(e)	International Type Search Report	$30	---	$35
1.21(g)		Self-Service Copy Charge	$0.15	---	$0.25
1.21(h)	1.21(h)	Recording Patent Property	$8	---	$40
1.21(i)	1.21(i)	Publication in the OG	$20	---	$20
1.21(j)		Labor Charges for Services	---	---	$30
1.21(k)	1.21(k)	Unspecified Other Services	Actual Cost	---	Actual Cost
1.21(l)	1.21(l)	Retaining Abandoned Application	$120	---	$130
1.21(m)	1.21(m)	Processing Returned Checks	$50	---	$50
1.21(n)	1.21(n)	Handling Fee - Incomplete Application	$20	---	$130
1.21(o)	1.21(o)	Terminal Use APS-TEXT	$40	---	$40
1.24	1.24	Coupons for Patent Copies	$1.50		$3
1.296	1.296	Handling Fee - Withdrawal SIR	$120	---	$130
1.445(a)(1)	1.445(a)(1)	Transmittal Fee	$170	---	$190
1.445(a)(2)(i)	1.445(a)(2)	PCT Search Fee - No U.S. Application	$550	---	$600 †
1.445(a)(2)(ii)	1.445(a)(2)	PCT Search Fee - Prior U.S. Application	$380	---	$400 †
1.445(a)(3)	1.445(a)(3)	Supplemental Search	$150	---	$160 †
1.482(a)(1)(i)	1.482(a)(1)	Preliminary Exam Fee	$400	---	$440 †
1.482(a)(1)(ii)	1.482(a)(1)	Preliminary Exam Fee	$600	---	$650 †
1.482(a)(2)(i)	1.482(a)(2)	Additional Invention	$130	---	$140 †
1.482(a)(2)(ii)	1.482(a)(2)	Additional Invention	$200	---	$220 †
1.492(a)(1)	1.492(a)(1)	Preliminary Examining Authority	$330	---	$620
1.492(a)(1)	1.492(a)(1)	Preliminary Examining Authority (Small Entity)	$165	---	$310
1.492(a)(2)	1.492(a)(2)	Searching Authority	$370	---	$690
1.492(a)(2)	1.492(a)(2)	Searching Authority (Small Entity)	$185	---	$345
1.492(a)(3)	1.492(a)(3)	PTO Not ISA nor IPEA	$500	---	$920
1.492(a)(3)	1.492(a)(3)	PTO Not ISA nor IPEA (Small Entity)	$250	---	$460
1.492(a)(4)	1.492(a)(4)	Claims - IPEA	$50	---	$90
1.492(a)(4)	1.492(a)(4)	Claims - IPEA (Small Entity)	$25	---	$45
1.492(a)(5)		Filing with EPO/JPO Search Report	---	---	$800
1.492(a)(5)		Filing with EPO/JPO Search Report (Small Entity)	---	---	$400
1.492(b)	1.492(b)	Claims - Extra Individual (Over 3)	$36	---	$72
1.492(b)	1.492(b)	Claims - Extra Individual (Over 3) (Small Entity)	$18	---	$36

* Revised small and large entity maintenance fees are applicable to all applications filed on or after December 12, 1980. H.R. 3531 combine maintenance fees established under Pub. L. 96-517 with maintenance fees set under PL 97-247. Only maintenance fees set under Pub. L. 97-247 were affected by November 5, 1990 surcharge.

** Combines surcharge for payment of maintenance fees during the 6-month grace period under Pub.L. 96-517 and surcharge set under Pub. L

† Effective December 27, 1991.

Comparison of Existing and Final Fee Amounts

37 CFR Section			FEE AMOUNT		
Final	Existing	DESCRIPTION	Apr 17 1989	Nov 5 1990	December 1991
1.492(c)	1.492(c)	Claims - Extra Total (Over 20)	$12	---	$20
1.492(c)	1.492(c)	Claims - Extra Total (Over 20) (Small Entity)	$6	---	$10
1.492(d)	1.492(d)	Claims - Multiple Dependents	$120	---	$220
1.492(d)	1.492(d)	Claims - Multiple Dependents (Small Entity)	$60	---	$110
1.492(e)	1.492(e)	Surcharge	$120	---	$130
1.492(e)	1.492(e)	Surcharge (Small Entity)	$60	---	$65
1.492(f)	1.492(f)	English Translation - After 20 Months	$30	---	$130
2.6(a)(1)	2.6(a)	Application for Registration, Per Class	$175	---	$200
2.6(a)(2)	2.6(u)	Amendment to Allege Use, Per Class	$100	---	$100
2.6(a)(3)	2.6(u)	Statement of Use, Per Class	$100	---	$100
2.6(a)(4)	2.6(v)	Extension for Filing Statement of Use, Per Class	$100	---	$100
2.6(a)(5)	2.6(b)	Application for Renewal, Per Class	$300	---	$300
2.6(a)(6)	2.6(s)	Surcharge for Late Renewal, Per Class	$100	---	$100
2.6(a)(7)	2.6(c)	Publication of Mark Under §12(c), Per Class	$100	---	$100
2.6(a)(8)	2.6(d)	Issuing New Certificate of Registration	$100	---	$100
2.6(a)(9)	2.6(e)	Certificate of Correction of Registrant's Error	$100	---	$100
2.6(a)(10)	2.6(f)	Filing Disclaimer to Registration	$100	---	$100
2.6(a)(11)	2.6(g)	Filing Amendment to Registration	$100	---	$100
2.6(a)(12)	2.6(h)	Filing Affidavit Under Section 8, Per Class	$100	---	$100
2.6(a)(13)	2.6(i)	Filing Affidavit Under Section 15, Per Class	$100	---	$100
2.6(a)(14)	2.6(j)	Filing Affidavit Under Sections 8 & 15, Per Class	$200	---	$200
2.6(a)(15)	2.6(k)	Petitions to the Commissioner	$100	---	$100
2.6(a)(16)	2.6(l)	Petition to Cancel, Per Class	$200	---	$200
2.6(a)(17)	2.6(l)	Notice of Opposition, Per Class	$200	---	$200
2.6(a)(18)	2.6(m)	Ex Parte Appeal to the TTAB, Per Class	$100	---	$100
2.6(b)(1)(i)	2.6(n)	Copy of Registered Mark	$1.50	---	$3
2.6(b)(1)(ii)		Copy of Registered Mark, Expedited	$1.50	---	$6
2.6(b)(1)(iii)		Copy of Registered Mark Ordered Via EOS, Expedited Svc.	---	---	$25
2.6(b)(2)(i)		Certified Copy of TM Application as Filed	---	---	$12
2.6(b)(2)(ii)		Certified Copy of TM Application as Filed, Expedited	---	---	$24
2.6(b)(3)		Cert. or Uncert. Copy of TM-Related File Wrapper/Contents	---	---	$50
2.6(b)(4)(i)	2.6(n)	Cert. Copy of Registered Mark, Title or Status	$6.50	---	$10
2.6(b)(4)(ii)		Cert. Copy of Registered Mark, Title or Status - Expedited	$6.50	---	$20
2.6(b)(5)	2.6(o)	Certified or Uncertified Copy of TM Records	$3.50	---	$25
2.6(b)(6)	2.6(q)	Recording Trademark Property, Per Mark, Per Document	$8	---	$40
2.6(b)(6)		For Second and Subsequent Marks in Same Document		---	$25
2.6(b)(7)	2.6(r)	For Assignment Records, Abstracts of Title and Certification	$12	---	$20
2.6(b)(8)	2.6(w)	Terminal Use T-SEARCH	$40	---	$40
2.6(b)(9)		Self-Service Copy Charge	---	---	$0.25
2.6(b)(10)		Labor Charges for Services	---	---	$30
2.6(b)(11)	2.6(t)	Unspecified Other Services	Actual Cost	---	Actual Cost
1.19(g)		Comparing and Certifying Copies, per Document, per Copy	---	---	$25
1.24		Trademark Coupons	$1.50	---	$3

NOTE: The November 5, 1990, column applies only to certain fee amounts.
Dashes indicate no change to the April 1989 fee amounts on November 5, 1990.

REEXAMINATIONS

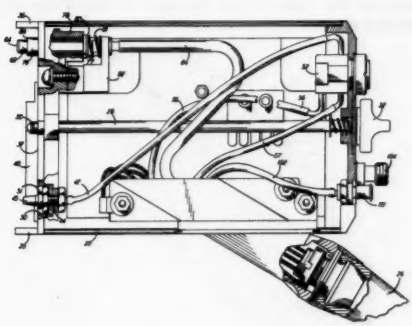
DECEMBER 17, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,539,586 (1608th)
CONNECTOR MODULE FOR VIDEO ENDOSCOPE SYSTEM

Dominick Danna, Syracuse; Robert C. Wheeler, Skaneateles, and Stanley R. English, Elbridge, all of N.Y., assignors to Welch Allyn Inc., Skaneateles Falls, N.Y.

Reexamination Request No. 90/002,149, Sep. 28, 1990.
Reexamination Certificate for Patent No. 4,539,586, issued Sep. 3, 1985, Ser. No. 539,982, Oct. 7, 1983.
Int. Cl.[5] H04N *7/18;* **A61B** *1/04, 1/06*
U.S. Cl. 358—98



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **12–20** is confirmed.

Claim **9** is cancelled.

Claims **1, 6, 10** and **11** are determined to be patentable as amended.

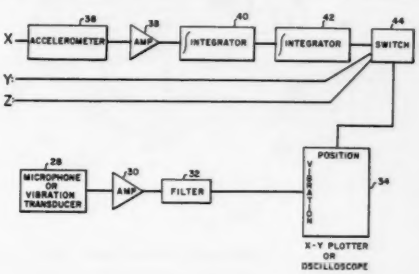
Claims **2–5, 7** and **8**, dependent on an amended claim, are determined to be patentable.

1. In a video endoscopic system including a video processor having an illumination source, a video monitor connected to the processor, and an insertion tube having a solid state imaging device at its distal end; the improvement comprising an interface module for releasably connecting the insertion tube to the processor, the proximal end of the insertion tube being operatively connected to the module, first coacting means in the module and processor for releasably securing the former to the latter, a fiber optic bundle in the module for transmitting light through the insertion tube to the distal end thereof, second coacting means in the module and processor for positioning the light receiving end face of the bundle at the focal point of the illumination source when the module and processor are secured together, an air supply conduit in the module for delivering air to the insertion tube, third coacting means in the module and processor for connecting the conduit in a sealed manner to an air supply conduit in the processor when the module and processor are secured together, and coacting electrical connector means on the module and processor that operate to connect *electronic* circuitry in the module with circuitry in the processor when the module and processor are secured together.

B1 4,836,218 (1609th)
METHOD AND APPARATUS FOR THE ACOUSTIC DETECTION AND ANALYSIS OF JOINT DISORDERS

Thomas Gay, West Hartford, Conn.; Charles N. Bertolami, Saugus, Mass., and David J. Solonche, West Hartford, Conn., assignors to Arthrotek, Inc., Hartford, Conn.

Reexamination Request No. 90/002,286, Feb. 25, 1991.
Reexamination Certificate for Patent No. 4,836,218, issued Jun. 6, 1989, Ser. No. 164,358, Mar. 4, 1988.
Continuation-in-part of Ser. No. 598,089, Apr. 9, 1984, abandoned, and a continuation-in-part of Ser. No. 598,265, Apr. 9, 1984, abandoned
Int. Cl.[5] A61B *7/00, 5/103*
U.S. Cl. 128—773



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1, 4, 7, 16, 25, 36, 37** and **48** are determined to be patentable as amended.

Claims **2, 3, 5, 6, 8–15, 17–24, 26–35**, and **38–47**, dependent on an amended claim, are determined to be patentable.

1. A procedure for diagnosing temporomandibular joint (TMJ) disorders, including the steps of:

detecting in timed sequence sound patterns propagated at the temporomandibular joint and defined as TMJ propagated sound patterns;

detecting in corresponding timed sequence time varying mandibular *lineal* bone displacement in three dimensions with respect to the detected TMJ propagated sound patterns; and

correlating the TMJ propagated sound patterns and the occurrence and duration thereof to the duration and *lineal* displacement of the corresponding mandibular bone movement whereby joint disorders are diagnosed.

B1 4,867,760 (1610th)
COATED ABRASIVE

Walter A. Yarbrough, Greenwich, N.Y., assignor to Norton Company, Worcester, Mass.

Reexamination Request No. 90/002,344, May 13, 1991.
Reexamination Certificate for Patent No. 4,867,760, issued Sep. 19, 1989, Ser. No. 641,647, Aug. 17, 1984.
Int. Cl.[5] C09K *3/14*
U.S. Cl. 51—298

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **13–18** is confirmed.

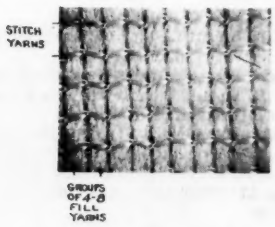
Claims **4** and **7** are cancelled.

Claim **1** is determined to be patentable as amended.

Claims **2, 3, 5, 6** and **8–12**, dependent on an amended claim, are determined to be patentable.

1. An improved flexible coated abrasive sheet material having abrasive grains adhesively bonded to one side of a backing, said backing comprising:

(a) a first array of non-interlaced substantially coplanar and coparallel reinforcing textile yarns, a second overlaid array of non-interlaced substantially coplanar and co-parallel reinforcing textile yarns said first and second arrays being oriented in two distinct directions from one another, said textile yarns of each array, together with the yarns of any other distinct arrays of non-interlaced substantially coplanar and co-parallel reinforcing textile yarns present in the back and oriented in the same direction, furnishing most of the tensile strength of said coated abrasive in the direction of orientations of said array *and at least said first and second arrays are bonded to each other by a stitching yarn*, and



(b) cured adhesive material substantially filling the spaces between the yarns of said first and second arrays and bonded thereto.

REISSUES

DECEMBER 17, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

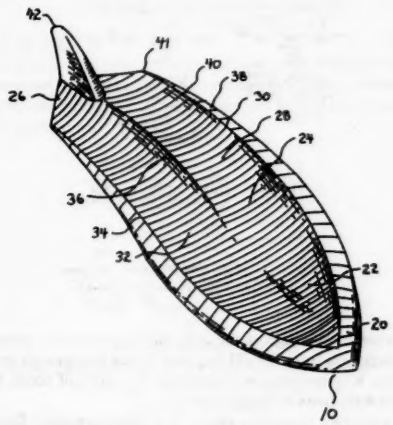
Re. 33,768
WATER SKI CONSTRUCTION

Ian C. Pitcairn, 11909 SE. 171st St., Toquesta, Fla. 33469

Original No. 4,629,435, dated Dec. 16, 1986, Ser. No. 777,193, Sep. 18, 1985. Continuation of Ser. No. 197,308, May 17, 1988, abandoned. Application for reissue Mar. 21, 1990, Ser. No. 516,464

Int. Cl.[5] A63C *15/00*

U.S. Cl. 441—68 **10 Claims**



1. A water ski construction, comprising:

(a) an elongated element having an upper and lower surface, said lower surface divided *along the major axis of said ski*, in the longitudinal direction, into a fore zone, a mid-zone, and an aft-zone, the lower surface thereof adapted to contact water,

[(b) said fore zone defining a single concave surface in the nature of an arrow-like depression, the point of the arrow of said depression directed along the major axis of said ski and in the direction of intended travel thereof,

(c)](*b*) said mid-zone defining first and second concave longitudinal channels separated by [a sharp] *an* edge of [arcuate] intersection between said first and second channels, said channels and said edge extending throughout said mid-zone and into said aft-zone, said mid-zone further including a surface which defines and frames the *entire* outer periphery of [both] said [fore- and mid-zones] *mid-zone* of said elongated element and, thereby, the outer transverse extent of said longitudinal channels, said transverse extent defining the minor axis of the ski,

[(d)] (*c*) said aft-zone including *an extension of* said pair of concave channels, absent said mid-zone [surfaces,] *surface, and*

[(e)] (*d*) the aft-zone tapered transversely inward to reduce, at its end, [to zero] the transverse width of the ski, [and

(f) the radial depth of said longitudinal channels progressively deepening at the mid-zone and lessening at said aft-zone as well as at the single concave surface of said fore-zone], whereby the above-defined contour of the lower surface operates to afford enhanced control and maneuverability of the ski.

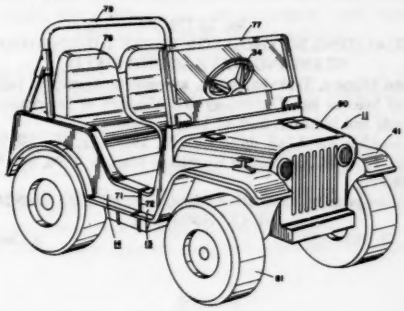
Re. 33,769
RIDABLE VEHICLE AND ASSEMBLY METHOD

Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco, San Francisco, Calif.

Original No. 4,709,958, dated Dec. 1, 1987, Ser. No. 910,019, Sep. 22, 1986. Application for reissue Nov. 8, 1989, Ser. No. 433,527

Int. Cl.[5] B62D *25/08;* **B62K** *9/00;* **A63H** *17/26*

U.S. Cl. 296—177 **14 Claims**



8. A child's ridable vehicle comprising:

a frame on which wheels are affixed;

first and second complimentary plastic body portions;

one of said body portions being the front and the other of said body portions being the rear of a body for a child's vehicle;

first and second inverted generally U-shaped sill portions on said first body portion;

first and second inverted generally U-shaped sill portions on said second body portion, in which the inverted U-shape has a bight of the U which is generally flat, horizontal and is complimentary to and laps over a respective one of said first and second sill portions on said first body portion;

alignment apertures in each said sill portion whereby fasteners installed through said alignment apertures in said overlapped sill portions of said body portions serve to locate said first body portion relative to said second body portion; and

locators on said first and second body portions for locating said body portions relative to said frame and fasteners for securing said body portions to said frame.

Re. 33,770
HEAT-FIXING APPARATUS

Mitsuhiro Torino, Fukaya, and Keitaro Yamashita, Kamisato, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Original No. 4,814,819, dated Mar. 21, 1989, Ser. No. 105,538, Oct. 8, 1987. Application for reissue Aug. 6, 1990, Ser. No. 562,698

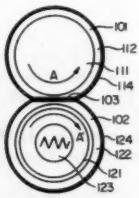
Claims priority, application Japan, Oct. 13, 1986, 61-242660; Apr. 24, 1987, 62-101676

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—290 **6 Claims**

4. A heat-fixing apparatus comprising a heating roll and a pressure roll, each of said heating roll and said pressure roll being constituted by a cylindrical core coated with a heat-resistant, resilient layer having a thickness of 1–2 mm and a thermal conductivity of 0.2×10^{-3} *cal/cm.sec. °C. or more, and a resin surface layer having release properties, the difference in outer diameter between said heating roll and said pressure roll being 5 mm or*

less, and said heating roll and said pressure roll having a surface hardness Hs of 85° or less and being in pressed contact with each



other at a linear pressure of 0.8–2.0 kg/cm to provide therebetween a flat nip portion.

Re. 33,771

VISUALIZING METHOD FOR THREE DIMENSIONAL STANDING WAVE SOUND FIELD

Hideto Mitome, Tsukuba, Japan, assignor to Agency of Industrial Science and Technology and Ministry of International Trade and Industry, both of Tokyo, Japan

Original No. 4,878,210, dated Oct. 31, 1989, Ser. No. 258,763, Oct. 17, 1988. Application for reissue Mar. 16, 1990, Ser. No. 494,391

Claims priority, application Japan, Nov. 19, 1987, 62-292640

Int. Cl.[5] H04B *1/02*

U.S. Cl. 367—137 **8 Claims**

1. A visualizing method for three dimensional standing wave sound field comprising:

charging into a container equipped with an ultrasonic wave transmitter a medium consisting essentially of a liquid and a plurality of fine particles of the same density as said liquid, and

causing said ultrasonic wave transmitter to transmit into said container ultrasonic waves of a frequency capable of forming a standing wave,

whereby said fine particles [ar] *are* caused to move to positions where the amplitude of the sound pressure is minimum and the sound pressure distribution of the three dimensional standing wave sound field is visualized by the distribution of the fine particles.

Re. 33,772

DELETION MUTANT OF A HERPESVIRUS AND VACCINE CONTAINING SAID VIRUS

Antonius J. M. Berns, Grave, and Arnold L. J. Gielkens, Lelystad, both of Netherlands, assignors to Centraal Diergeneeskundig Instituut, Lelystad, Netherlands

Original No. 4,680,176, dated Jul. 14, 1987, Ser. No. 660,097, Oct. 12, 1984. Application for reissue Aug. 2, 1988, Ser. No. 227,194

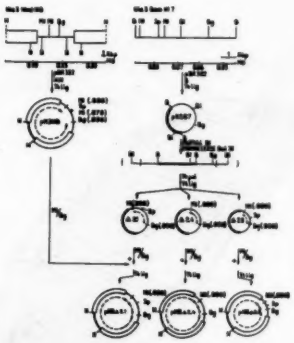
Int. Cl.[5] A61K *39/12*; C12N *15/00, 7/04*

U.S. Cl. 424—89 **9 Claims**

1. A live deletion mutant of a pseudorabies virus [derived from a] *obtained by introducing, by means of recombinant DNA techniques, one or more deletions into the genome of a virulent* parental strain having a parental genome of about 160,000 nucleotide pairs, said parental genome comprising

(a) two inverted repeats, each of which contains cleavage sites for the restriction endonucleases BamHI and KpnI, BamHI digestion of the parental genome yielding two pairs of restriction fragments derived entirely from the sequence of the inverted repeats, the larger fragment of each pair being designated as BamHI fragments 5; and KpnI digestion of the genome yielding two fragments, designated KpnI fragment E and [kpnI] *KpnI* fragment H, each of said KpnI fragments containing the distal end of one of the inverted repeats;

(b) a unique sequence located between the inverted repeats, said unique sequence comprising a BamHI restriction fragment of about 7 kilobase pairs in length designated BamHI fragment 7, said BamHI fragment 7 containing a cleavage site for the restriction endonuclease SalI,



wherein cleavage at the SalI site produces two unequal fragments from BamHI fragment 7, one fragment of about five kilobase pairs in length and the other of about two kilobase pairs in length; and

(c) a gene for thymidine kinase, said deletion mutant [being characterized by one or more deletions, said deletions being located in

(i) a portion of an inverted repeat which is common to BamHI fragment 5 and either KpnI fragment E or KpnI fragment H;

(ii)] *having a deletion in* the about five kilobase pair SalI fragment of BamHI fragment 7, [or

(iii) both] *such that the mutant is less virulent that the parental strain.*

Re. 33,773

METHOD OF MANUFACTURING A SAG-RESISTANT BONDED PARTICULATE MATTER

Gerald J. Guerro, Trumbell, Conn., and Gregory G. Borsinger, Boonton, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Original No. 4,942,085, dated Jul. 17, 1990, Ser. No. 433,984, Nov. 15, 1989. Continuation-in-part of Ser. No. 299,284, Jan. 23, 1989, abandoned. Application for reissue Aug. 20, 1990, Ser. No. 570,193

Int. Cl.[5] D04H *1/58*

U.S. Cl. 428—288 **19 Claims**

1. A method of preventing or minimizing humidity-induced sag in bonded particulate substrates comprising applying to at least one side of said particulate substrate a coating composition comprising an aqueous dispersion of a mixture of an effective amount of a glyoxal resin or derivative thereof and an effective amount of a starch compound *which contains less than about 50% by weight of insolubles*, and an effective amount of a filler material, and curing said coating composition.

19. A bonded particulate article resistant to humidity-induced sag produced in accordance with the method of claim 1.

PLANT PATENTS

GRANTED DECEMBER 17, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,749

HYBRID TEA ROSE PLANT NAMED PEKCOUJENNY

Paul Pekmez, La Petite Pierre, 67290 Wingen-Sur-Moder, France

Filed Aug. 8, 1990, Ser. No. 564,418
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—21 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea rose class, substantially as shown and described, suitable for cut flower production and characterized particularly by attractive cardinal red flowers.

7,750

OLIVE PLANT TIZAM

James W. Zampini, P.O. Box 122, Perry, Ohio 44081

Filed Aug. 10, 1989, Ser. No. 396,470
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—33 **1 Claim**

1. A new and distinct cultivar of *Elaeagnus umbellata*, substantially as herein shown and described, characterized particularly by a uniquely upright branching structure and a width at maturity of approximately 5 feet.

7,751

PEACH TREE "EVA'S PRIDE"

Chris F. Zaiger, 537 Rosemore Ave.; Gary N. Zaiger, 1907 Elm Ave.; Leith M. Gardner, 1207 Grimes Ave., and Grant G. Zaiger, 4005 California Ave., all of Modesto, Calif. 95351

Filed Oct. 29, 1990, Ser. No. 605,671
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree, substantially as illustrated and described, characterized by its large size, vigorous, semi-upright growth, its low winter chilling requirement of approximately 250 hours and being a regular and productive bearer of large size, yellow flesh, clingstone fruit with good flavor and eating quality; in comparison to its low chilling parent, Desert Gold Peach (non-patented), the fruit is larger in size, has firmer flesh with greater shipping quality, ripens more uniformly, and is approximately two weeks later in maturity.

7,752

POINSETTIA NAMED GROJI

Bruno Gross, "Le Bois" Angeac Champagne 16130 Segonzac, 16130 Segonzac Charente, France

Filed Dec. 6, 1989, Ser. No. 466,883
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—86 **1 Claim**

1. A new and distinctive Poinsettia cultivar, substantially as herein shown and described, particularly distinguished by large, bright red bracts, strong stems and small leaves with very deep incisions and a short, self-branching growth habit.

PATENTS

GRANTED DEC. 17, 1991

ERRATA

For CLASS	See PATENT NO.
30-028	5,072,511
30-041	5,072,512
30-161	5,072,513
30-169	5,072,514
92-161	5,072,607
72-414	5,072,620
454-255	5,072,656
454-153	5,072,657
454-188	5,072,658
454-174	5,072,659
164-045	5,072,782
220-004	5,072,828
226-176	5,072,872
128-400	5,072,875
273-085	5,072,880
385-014	5,073,000
385-019	5,073,001
385-049	5,073,002
385-033	5,073,003
385-027	5,073,004
359-515	5,073,005
359-561	5,073,006
359-565	5,073,007
359-589	5,073,008
359-601	5,073,009
359-072	5,073,010
359-265	5,073,011
359-265	5,073,012
359-063	5,073,013
359-490	5,073,014
359-680	5,073,015
359-727	5,073,016
359-557	5,073,017
359-368	5,073,018
359-872	5,073,019
417-138	5,073,158
264-320	5,073,237
524-609	5,073,577
523-442	5,073,580
536-027	5,073,609
525-068	5,073,620

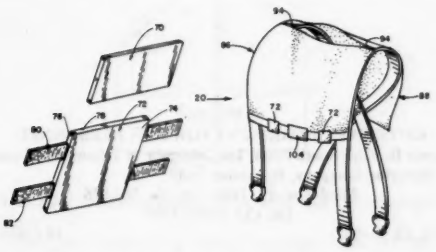
556-064	5,073,643
556-482	5,073,644
556-013	5,073,645
548-953	5,073,646
548-348	5,073,671
235-436	5,073,700
359-328	5,073,725
395-425	5,073,851
395-700	5,073,852
395-575	5,073,853
395-425	5,073,854
395-375	5,073,855
395-375	5,073,856
395-027	5,073,867
395-112	5,073,868
380-003	5,073,925
359-142	5,073,979
359-140	5,073,980
359-174	5,073,981
359-120	5,073,982
359-187	5,073,983

PATENTS

GRANTED DECEMBER 17, 1991

GENERAL AND MECHANICAL

5,072,453
BODY PROTECTION SYSTEM
Nathaniel Widder, #South Farragut St., Philadelphia, Pa. 10129
Filed Mar. 8, 1990, Ser. No. 490,294
Int. Cl.[5] F41H *1/02*
U.S. Cl. 2—2.5 **2 Claims**



1. A body protection system comprising:

A) a suspension unit which fits over a trunk section of a user and which includes

(1) a suspenders-like cage having

(a) a first posterior strap extending diagonally across a user's back when the suspension unit is in place on the user, said first posterior strap including a superior end located adjacent to a user's shoulder when the suspension unit is in place on the user, and a bottom end,

(b) a second posterior strap extending diagonally across the user's back when the suspension unit is in place on the user and which intersects said first posterior strap, said second posterior strap including a superior end located adjacent to the user's shoulder when the suspension unit is in place on the user, and a bottom end,

(c) a connecting means connecting said first and second straps together at the intersection of said first and second straps,

(d) attachment means on the bottom end of each of said posterior straps for releasably attaching said posterior straps to clothes of the user,

(e) a right anterior strap having a superior end connected to the superior end of said first posterior strap and a bottom end, said right anterior strap extending downwardly over the user's chest when the cage unit is in place on the user,

(f) a left anterior strap having a superior end connected to the superior end of said second posterior strap and a bottom end, said left anterior strap extending downwardly over the user's chest when the cage unit is in place on the user,

(g) attachment means on the bottom end of each anterior strap for releasably attaching said anterior straps to clothes of the user, and

(h) a waist belt having one end thereof releasably attached to said right anterior strap and another end thereof releasably attached to said left anterior strap and extending laterally across a user's abdominal area when the cage unit is in place on the user, said waist belt including a lap protector element releasably mounted thereon;

B) additional support belts releasably attached to said cage unit and including

(1) a shoulder belt having one end thereof releasably attached to said right anterior strap and another end thereof releasably attached to said left anterior strap and extending laterally across a user's chest area adjacent to the user's throat when the cage unit is in place on the user,

(2) a back protector releasably attached to said posterior straps,

(3) a chest protector releasably attached to said anterior straps,

(4) a first additional strap extending over one of the user's shoulders and having one end thereof releasably attached to said first posterior strap and having another end thereof releasably attached to said right anterior strap, and

(5) a second additional strap extending over another one of the user's shoulders and having one end thereof releasably attached to said second posterior strap and having another end thereof releasably attached to said left anterior strap;

C) releasable attaching means on each of said anterior straps, on each of said posterior straps, on said first and second additional straps, on said waist belt, on each of said additional support belts, on said shoulder belt, on said back protector and on said chest protector, said releasable attaching means including hook-and-loop fastening means; and

D) pocket support elements releasably attached to said anterior and to said posterior straps, each of said pocket support elements including

(1) a front wall,

(2) a rear wall,

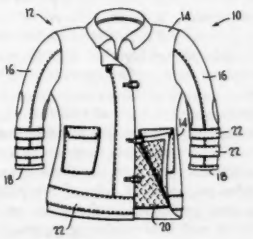
(3) said front and rear walls being connected together along edges of said walls, with one edge on said front wall being unconnected to a corresponding edge of said rear wall so that said front and rear walls define a pocket,

(4) hook-and-loop fastening means on said pocket element rear wall, and

(5) a steel bar attached to each pocket element; and

E) a bulletproof plate located in each pocket element.

5,072,454
GARMENTS WITH APPENDAGE PORTIONS HAVING EXTENSIBLE FLEXIBLE JOINTS
Robert L. Trahan, Bedford, N.H., assignor to Globe Manufacturing Company, Pittsfield, N.H.
Filed Aug. 15, 1990, Ser. No. 567,777
Int. Cl.[5] A41D *1/02*
U.S. Cl. 2—70 **20 Claims**



1. A garment to be worn about a human body having a torso and at least one appendage with a flexible joint, the garment comprising a torso-covering portion and an appendage-covering portion connected to the torso-covering portion, the appendage-covering portion having a generally rectangular aperture positioned about at least a portion of the flexible joint of the appendage, the aperture having two significant dimensions perpendicular to each other and with a periphery and being filled with an insert secured to the appendage-covering portion

about its periphery, the insert having a dimension in one direction which is greater than the dimension of the aperture in the same direction when the appendage-covering portion is not flexed.

5,072,455

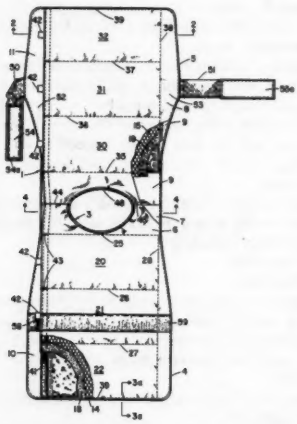
HEAT-INTERCEPTING GARMENT OR BLANKET

Thomas A. St. Ours, 1548 County Rd. 240, Apt. 9, Durango, Colo. 81301

Continuation of Ser. No. 317,015, Feb. 27, 1989, abandoned, which is a continuation-in-part of Ser. No. 80,674, Jul. 31, 1987, abandoned. This application Jan. 23, 1991, Ser. No. 644,749

Int. Cl.[5] A41D *1/04, 27/12*

U.S. Cl. 2—81 **16 Claims**



1. A shield comprising heat-intercepting means wrappable in a circumferential direction around at least a major portion of an object for protecting a portion of said object against an external source of radiant, conductive and convective heat comprising a flexible casing having front and rear flexible fabric members, said members being secured together and providing a plurality of elongated rectangular facial heat-intercepting areas of equal size extending in said circumferential direction and constituting essentially the primary heat-intercepting means at the exterior of said shield, each said area having four peripheral sides and generally rectangular corners, said shield having within said casing throughout each said area three layers comprising, successively, in the direction away from the source of said heat, a flexible layer of heat-reflective non-breathable material, a flexible layer of heat-insulating material, and a generally flat flexible multi-sectioned removable and replaceable packet layer of heat-dissipating material for absorption of heat, said packet layers being of the same size and covering an area substantially coextensive in size with the respective heat-interception each of said three layers for each area being between two respective flexible casing members with said heat-reflective and said heat-insulating layers being permanently stitched to both of the flexible members along two parallel sides and a third side of the periphery of the respective heat-intercepting area, the three parts comprising said heat-reflecting and heat-insulating layers and one of said flexible casing members being permanently stitched to each other along the fourth side of said respective area, and manually separable means for releasably securing said three parts to the other flexible member along the entire fourth side of each said area to permit removal and insertion of a respective packet and to enclose and to closely confine said packet layer of heat-dissipating material against movement relative to said periphery, said shield being supportable when separated from the object to be protected in a position wherein said manually separable means for all said areas area arranged with respect to each other whereby all said packets may be inserted into said shield along parallel paths in a common direction, said heat reflecting and heat insulating layers each being unattached to one another and unattached to either of said flexible members over the area of each packet layer within said four sides at each heat-intercepting area.

5,072,456

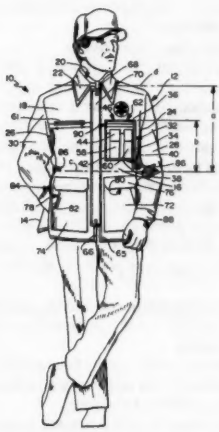
OUTERWEAR GARMENT FOR EMS PERSONNEL

Lewis R. Elin, South Bend, Ind., assignor to Edmonton Manufacturing Company, Rochester, Ind.

Filed Aug. 17, 1990, Ser. No. 568,826

Int. Cl.[5] A41D *1/04*

U.S. Cl. 2—94 **14 Claims**



1. An outerwear garment for use by emergency medical services personnel comprising:

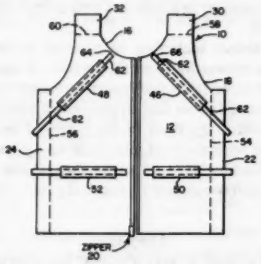
an upper body covering portion including a back panel, a left front panel and a right front panel, a top neck opening and left and right side arm hole openings, means for selectively joining and disjoining the left front panel and the right front panel together and at least one tool holster panel, said tool holster panel having a length dimension defined between a top edge and an opposed bottom edge and a width dimension defined between left and right spaced and opposed side edges, said holster panel further having a front surface and a rear surface and having a plurality of pocket means defined therein, each of said pocket means having an entrance opening disposed in said front surface, said garment further including means hingedly connecting the top edge of a said holster panel to a said front panel so that said entrance openings are visually observable by a wearer from the top in a direction parallel to the length dimension of the holster panel, the bottom edge of the holster panel being generally free to swing away from the adjacent front panel so that if the wearer bends over forwardly from the waist, items placed in the pocket means will not fall out and will remain visible and within easy manual reach and access of the wearer.

5,072,457

CUSTOM-FITTED HARNESS FOR AN AVIATOR

Armand J. Aronne, Massapequa, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jun. 8, 1990, Ser. No. 534,949
Int. Cl.[5] A41D *1/04*
U.S. Cl. 2—102 4 Claims



2. A pilot harness adaptable for a wide range of sizes comprising:

a front vest panel having side and shoulder edges, and having flaps extending outwardly from the side and shoulder edges;

a back vest panel having side and shoulder edges, and having flaps corresponding to those of the front panel and extending outwardly from the side and shoulder edges of the back panel;

means for removably securing preselected areas of the respective side and shoulder flaps together to create a vest adapted to fit various torso sizes,

a plurality of strips of material secured along lateral edges thereof to the vest panels for creating passages through the strips;

at least one length of harness strap temporarily threaded through a preselected number of passages;

means passing through the respective removably secured side and shoulder flaps for permanently fastening these flaps together;

means passing through the strips and the enclosed strap for permanently fastening the strap relative to the vest; and

a central closure means located in the vest for enabling the vest to be easily put on and taken off.

5,072,458

VEST FOR USE IN AN AMBULATORY PHYSIOLOGICAL EVALUATION SYSTEM INCLUDING CARDIAC MONITORING

Arata Suzuki, Ramsey, N.J., assignor to Capintec, Inc., Ramsey, N.J.

Continuation-in-part of Ser. No. 96,521, Sep. 15, 1987, Pat. No. 5,007,427, which is a continuation-in-part of Ser. No. 46,854, May 7, 1987, Pat. No. 4,920,969, which is a division of Ser. No. 785,549, Oct. 8, 1987, abandoned. This application Aug. 17, 1989, Ser. No. 395,082
Int. Cl.[5] A41D *1/04;* A61B *5/04*
U.S. Cl. 2—102 7 Claims

4. A vest for use in an ambulatory physiological evaluation system, said vest comprising:

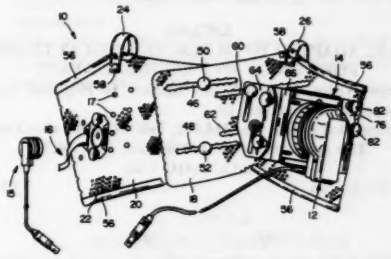
a chest member containing first and second detachable side members which are detachable at the front and back of the vest, said chest member shaped to cover the upper torso and the chest of a patient;

shoulder straps connected to each of said side members for passing over each shoulder of the patient and holding the vest on the patient;

coupling means positioned between teh first and second side members at the back of the vest; and

quick-release means connected to said coupling means for detachably connecting the coupling means to said first and second side members;

wherien one fo said first and second side members has parallel slots on the front portion thereof for receiving a radiation detector mounting bracket assembly, said assembly capable of being adjustably positioned on said vest in said slots.



5,072,459

PRECURLED MITTEN

Stephen D. Kogler, Baltimore, Md., assignor to Stephen D. Kogler and Christopher A. Kogler, both of Brooklyn, N.Y.

Filed Dec. 8, 1989, Ser. No. 450,276
Int. Cl.[5] A41D *19/00*
U.S. Cl. 2—158 17 Claims

1. A precurled mitten for gripping a hand-holdable force transmission rod, such as a sail boom as used in wind surfing, comprising:

a rear wrist enclosing section and a front hand enclosing section integral therewith to form a mitten cavity, having an entrance thereto:

said hand enclosing section terminating in a generally permanently curved hook portion following the natural, relaxed contour of a curled hand of a user, to receive the first four fingers of the hand, and having an opposed thumb portion, following the natural, relaxed contour of the corresponding thumb, to receive the thumb;

the hook and thumb portions defining therebetween an external bore space sized and shaped to receive therein such a force transmission rod;

said wrist and hand enclosing sections being formed of material capable of transmitting an exerted gripping force therethrough, the thumb portion being movable relative to the curved hook portion;

said hand enclosing section including a back hand panel, a palm panel, a little finger side panel and a thumb side panel, each panel being defined by respective edges, one end of each said panel respectively extending lengthwise away from the entrance of the mitten cavity toward said curved hook portion, the other ends of said back hand and palm panels being joined together to form an extremity of said hook portion, the remaining edges of said back hand and palm panels being separated, said side panels tapering

at their respective other ends and bridging the separations between said back hand and palm panels, at least the curved hook portion of said hand enclosing section tapering toward said hook extremity.

5,072,460

MASK ADAPTED TO BE PLACED OVER AT LEAST A PORTION OF AN INDIVIDUAL'S FACE

Andrew Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

Continuation of Ser. No. 314,942, Feb. 24, 1989, abandoned.
This application Apr. 4, 1990, Ser. No. 504,707
Int. Cl.[5] A41G *7/00*
U.S. Cl. 2—206 **7 Claims**

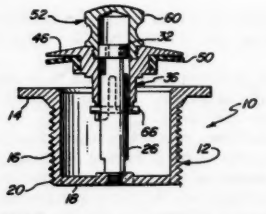
1. A flexible face mask having a predetermined shape comprising a flexible sheet material having a thickness in a range from less than about 1.5 mils to about 30 mils and including a plurality of overlapping folds of varying lengths which extend at varying angles over the mask surface and cooperatively maintain said flexible sheet material in said predetermined shape yet substantially flexible.

5,072,461

MOVABLE FITTING MEMBERS FOR USE WITH DRAIN FITTINGS

Duane D. Logsdon, Fullerton, Calif., assignor to The Logsdon Foundation, Fullerton, Calif.

Filed Nov. 14, 1990, Ser. No. 613,117
Int. Cl.[5] A47K *1/14*
U.S. Cl. 4—295 **9 Claims**



1. A movable fitting member for use with

a drain fitting which has an upper annular lip section for engaging a plumbing fixture, a cylindrical sleeve extending downward from the interior of said lip section, a threaded post holder located at the center of the lower end of said sleeve, said post holder having an internally threaded opening which is axially aligned with said sleeve, arm means extending inwardly from the lower end of said sleeve and supporting said post holder,

said fitting member including a post having a lower threaded end which is adapted to be threaded into said opening in said post holder so that said post extends upwardly along the axis of said cylindrical sleeve,

said fitting member also including a movable body,

said body including a guide sleeve fitting around said post in such a manner that said body can be moved so as to vary the position of said body relative to said fitting member and said post in order to accomplish a flow control function in connection with liquid flowing through said fitting member from the top to the bottom thereof,

in which the improvement comprises

said post also has an upper threaded end, the diameters of said threaded ends of said post being different so as to permit one end of said post to be threaded into an opening of one diameter in a post holder and so as to permit the other end of said post to be threaded into an opening of a different diameter in a different post holder when said post is inverted,

said guide sleeve including an internal annular shoulder extending outwardly from the interior of said sleeve at a location remote from said lower threaded end, and

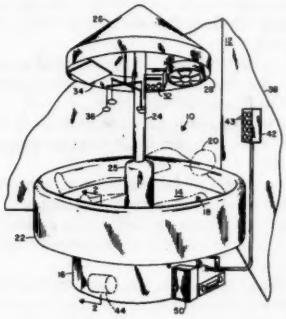
nut means threaded on said upper end of said post for preventing said body from being removed from said post during the normal use of said drain fitting, said nut means being sufficient large so as to engage said shoulder in order to limit movement of said body relative to said post.

5,072,462

ROTATING POSITIONING PLATFORM

Daniel J. Attison, 139 Commack Rd., North Babylon, N.Y. 11703

Filed Jan. 7, 1991, Ser. No. 637,740
Int. Cl.[5] A61G *7/00*
U.S. Cl. 5—60 **8 Claims**



1. Rotating positioning apparatus for use with a client population consisting of non-ambulatory patients having a mental age in the range of zero to five years, for subjecting said patients to a variety of stimulii comprising a stationary base means supporting a rotatable platform circular in configuration, mattress means located on the top of said platform, a bolster of cushion-like construction mounted along the complete outer periphery of said platform extending above said mattress means and below said platform, vertical pole means extending up through the center of said platform supporting at the top thereof a canopy, said canopy being divided into a plurality of quadrants in which are mounted a source of a stimulation in each of said quadrants.

5,072,463

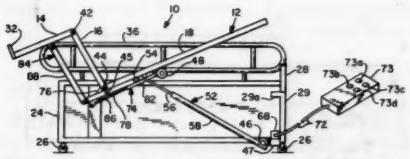
EZ ACCESS BED

William J. Willis, P.O. Box 184, Westhampton Beach, N.Y. 11978

Filed Apr. 11, 1991, Ser. No. 683,699
Int. Cl.[5] A61G *7/00*
U.S. Cl. 5—62 **9 Claims**

1. A bed comprising extended platform means extending from a right end to a left end for supporting thereon a mattress and an occupant of said bed, said platform means comprising a head segment at the right end, a foot segment at the left end, and an intermediate segment in between the head and foot segments, first shaft means joining the head and intermediate

segments permitting said intermediate segment to be rotated with respect to said head segment, second shaft means joining the foot and intermediate segments permitting said foot segment to be rotated with respect to said intermediate segment, third shaft means mounted on said head segment, frame means supporting said third shaft means for rotating said platform means around said third shaft means, said frame means having head and foot leg means for supporting said bed on a floor and having headboard means adjacent the head end of said platform means attached to said head leg means and having means



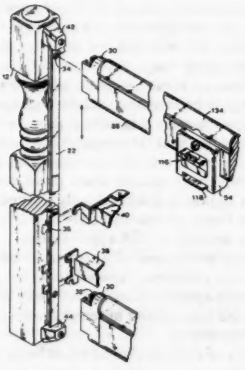
to limit the rotation of said platform means in the clockwise direction to the horizontal position when said head and foot leg means are supported on a floor, first power means for rotating said intermediate segment about said first shaft means, second power means for rotating said head segment about said third shaft means capable of putting said occupant in a standing position when all of said segments are in a common plane, and pantograph means for rotating said foot segment with respect to said intermediate segment in response to rotation of said intermediate segment by said first power means.

5,072,464

CRIB DROPSIDE INCLUDING LATCH MECHANISM

Harvey J. Draheim, Weyauwega; Glenn T. Charlson, New London; John L. Beiswenger, Salem, and Merlin A. Brunner, New London, all of Wis., assignors to Simmons Juvenile Products Company, Inc., New London, Wis.

Filed Nov. 6, 1987, Ser. No. 118,749
Int. Cl.[5] A47D *7/00*
U.S. Cl. 5—93.1 **10 Claims**



1. A crib comprising:

first and second corner posts;

first and second tracks mounted to said first and second corner posts, respectively;

a dropside slidably mounted to said tracks, said dropside including a top rail;

means for locking said dropside to said tracks at a selected vertical position;

a latch mechanism mounted to said dropside;

a horizontal groove extending within the front surface of said top rail;

a vertical slot extending within said front surface of said top rail, said vertical slot adjoining said horizontal groove, said latch mechanism extending at least partially within said vertical slot;

a cable extending through said horizontal groove and connected between said latch mechanism and said locking means; and

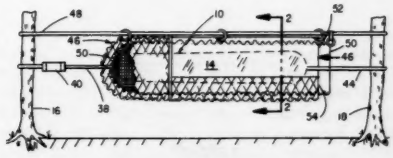
said latch mechanism including means for moving said cable axially within said horizontal groove, thereby actuating or deactuating said locking means.

5,072,465

SUSPENDABLE SLEEPING BAG

William J. Lyons, Jr., P.O. Box 1223, Tulsa, Okla. 74101

Filed Jul. 18, 1990, Ser. No. 553,742
Int. Cl.[5] A47F *3/22*; A47G *9/08*
U.S. Cl. 5—121 **9 Claims**



1. In a suspendable hammock-sleeping bag combination in which a bottom portion of an insulated sleeping bag is attached to a bottom portion of a hammock comprising suspending means, and a top portion of the insulated sleeping bag is adapted to cover a user resting on the top of the hammock, the improvement comprising:

an air permeable mosquito/bug wrapper adapted to be slidably supported on a line stretched above the suspended hammock-sleeping bag combination, and a waterproof cover adapted to be slidably supported on the same stretched line on which the wrapper is supported, the wrapper and the cover each having a generally closed end and a generally open end, the wrapper adapted to be spaced around and generally surround the hammock-sleeping bag combination, and the cover adapted to be spaced around and generally surround the wrapper, whereby the wrapper and the cover are adapted to be slid on the stretched line from a first position in which they are laterally spaced from the hammock-sleeping bag combination, to a second position in which they are in a surrounding and covering relationship to the hammock-sleeping bag combination.

5,072,466

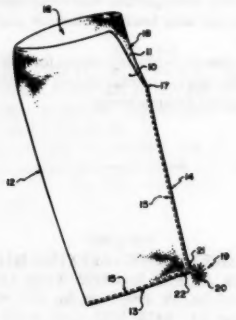
LINER FOR A SLEEPING BAG

Larry D. Bond, and Donna M. Bond, both of 3811 44 Street South West, Calgary, Alberta, Canada T3E 3S4

Filed Jun. 25, 1990, Ser. No. 543,039
Int. Cl.[5] A47G *9/08*
U.S. Cl. 5—413 **10 Claims**

1. A liner for a sleeping bag comprising substantially rectangular liner bag formed from two overlying sheet portions of a fabric material stitched together to define a closed lower end of the liner bag, two sides of the liner bag and an open mouth of the liner bag, one corner of the liner bag defined at the junction between the lower end and one side having projecting there-

from a member having a narrow neck for projecting through a narrow opening in the sleeping bag and a head portion wider



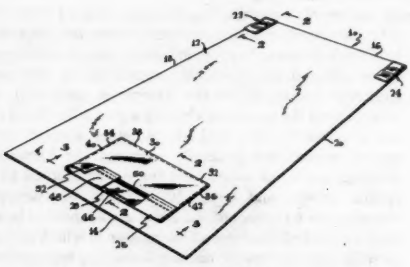
than the neck to retain the head portion outside the sleeping bag.

5,072,467

BEACH TOWEL WITH POCKETS

Sean P. Hunt, 10501-1 Larwin Ave., Chatsworth, Calif. 91311

Filed Jun. 5, 1991, Ser. No. 710,460
Int. Cl.[5] A47G *9/06*
U.S. Cl. 5—417 **17 Claims**



1. A beach towel comprising:

a towel sheet having first and second corners at a first end thereof;

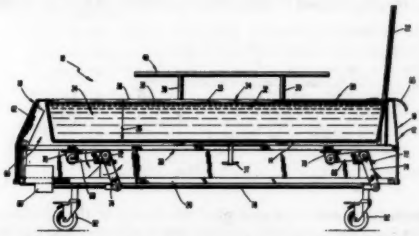
at least first, second and third pockets formed on said towel sheet, each of said pockets having an inner and an outer panel, said inner and outer panels each being attached to said towel sheet along their bottom and sides edges to leave an open top edge to form said pocket, said inner panel being longer than said outer panel to fold back over said outer panel to form a flap which closes said pocket, said first and second pockets being positioned adjacent said first and second corners, said third pocket being positioned away from said first end, said third pocket being sufficiently large to form a head rest when filled with sand so that said towel sheet can be laid out on the beach sand and said first, second and third pockets can be filled with sand so that said first and second sand-filled pockets hold down said first and seconds corners of said towel sheet and said third pocket can serve as a head rest for a beach goer resting on said towel, at least said third pocket being formed of sand-transmission resistant fabric.

5,072,468

FLOTATION THERAPY BED FOR PREVENTING DECUBITUS ULCERS

Mark Hagopian, Indian Rocks Beach, Fla., assignor to Biologics, Inc., St. Petersburg, Fla.

Filed Jan. 22, 1991, Ser. No. 643,972
Int. Cl.[5] A47C *27/10;* **A61G** *7/012, 7/057*
U.S. Cl. 5—451 **6 Claims**



1. A bed, comprising:

a base member having an elongate flat bottom wall, a pair of transversely disposed end walls formed integrally therewith at opposite ends thereof, and a pair of longitudinally extending side walls formed integral thereto;

an upwardly opening cavity means collectively defined by said end walls, said bottom wall, and said side walls;

a three-chambered mattress member configured and dimensioned to fit within said cavity means;

a first, lowermost chamber of said mattress adapted to be at least partially filled with water;

a second chamber of said mattress adapted to be at least partially filled with air;

said second chamber having a length and width substantially equal to the length and width of said first chamber;

a third chamber, positioned atop said first and second chambers, adapted to be at least partially filled with air;

said third chamber having a length about one-third that of said first and second chambers, said third chamber extending longitudinally from a preselected end of said second chamber;

said third chamber having a wedge-shaped profile when filled with air and when viewed in side elevation;

means for selectively inflating and deflating said second and third chambers so that a patient is easily delivered to or removed from or turned over on said bed when said second chamber is inflated and said third chamber is deflated and whereby a patient is held in at least a partially sitting-up position when said third chamber is inflated;

a rectangular upper frame and a rectangular lower frame;

a pair of transversely spaced apart pivot bases depending from each opposite, longitudinally spaced apart end of each upper frame, so that there are four of said depending pivot bases secured to said upper frame;

a pair of transversely spaced apart pivot bases fixedly secured to and projecting upwardly from each opposite, longitudinally spaced apart end of each lower frame, so that there are four of said upstanding pivot bases secured to said lower frame;

a first plurality of rigid link members of linear configuration, each link member of said first plurality of link members being disposed in interconnecting relation between an associated depending pivot base and upstanding pivot base and each of said link members being pivotally secured at its opposite ends to said associated pivot bases;

a second plurality of rigid link members of linear configuration, each link member of said second plurality of link members having a first, upper end pivotally secured to an associated upstanding pivot base;

a pair of elongate, transversely spaced, longitudinally disposed and axially displacable rods of linear configuration being disposed in interconnecting, pivotally mounted

relation to respective second, lower ends of said second plurality of link members;

each of said first and second link members being disposed in a preselected angular relation with respect to one another and being fixedly secured to one another at the respective ends thereof that are pivotally secured to said upstanding pivot bases;

means for effecting simultaneous axial displacement of said rods; and

said first and second plurality of link member maintaining their preselected angular relation as said second, lower ends of each of said link members of said second plurality of link members are displaced by axial displacement of said rods.

5,072,469

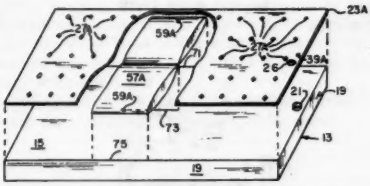
WATERBED MATTRESS WITH AIR CUSHION

Dennis Boyd, 14457 Rouge River, Chesterfield, Mo. 63017

Division of Ser. No. 655,113, Feb. 14, 1991. This application Apr. 15, 1991, Ser. No. 685,620

Int. Cl.[5] A47C *27/10*

U.S. Cl. 5—451 **4 Claims**



1. A waterbed mattress of a size sufficient to totally support a supine or prone user, comprising:

a vinyl watertight bladder for holding water, said watertight bladder having a top, a bottom, and sides when filled at least partially with water;

an inflatable air cushion disposed on the top of the vinyl watertight bladder and secured thereto, said air cushion extending generally the length and breadth of the top of the vinyl watertight bladder, said air cushion being composed of two layers of vinyl, sealed around the edges, said air cushion composed of two layers of vinyl being secured to the top of the vinyl watertight bladder; and

an inflatable air bladder disposed between the air cushion and the vinyl watertight bladder, said bladder having an area that is smaller than the area defined by the length and breadth of the top of the vinyl watertight bladder, thereby providing localized support for a user of the waterbed mattress.

5,072,470

DEVICE FOR HOLDING BEDCLOTHES IN A FIXED POSITION ON A BED

Phillip J. Lysiak, 50 Sylvan Ave., Meriden, Conn. 06450

Continuation of Ser. No. 440,897, Nov. 11, 1989, abandoned. This application Jan. 24, 1991, Ser. No. 647,178

Int. Cl.[5] A47G *9/04*

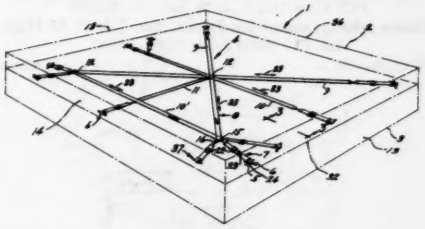
U.S. Cl. 5—496 **20 Claims**

1. A device for holding bedclothes in a fixed position on a bed having an associated uppermost cushioned structure and a structure upon which said uppermost cushioned structure is disposed, which comprises:

a. a plurality of bedclothes gripping means for releasably grasping a plurality of bedclothes therein, each of said bedclothes gripping means having clamping means for detachably grasping a plurality of bedclothes at any one location therein,

b. a plurality of bedclothes retaining means for holding said gripping means to an anchoring means, and

c. an anchoring means for connecting one of said bedclothes retaining means and bedclothes gripping means on one side of the bed to a plurality of said bedclothes retaining means and bedclothes gripping means on another side of the bed; said anchoring means comprising a member which is independent of and separate from said uppermost cushioned stucture and said structure upon which said uppermost cushioned structure is disposed; said device being disposed under said uppermost cushioned structure of a bed and being of overall dimension substantially not



extending outwardly beyond the perimeter of the lower edge of said uppermost cushioned structure of a bed, whereby said overall dimension causes a person to attach said device to said bedclothes at a plurality of locations substantially under said uppermost cushioned structure and so causing said bedclothes to be positioned into maximum frictional contact with the upper and the lower edges, and the top, sides, and under surfaces of said uppermost cushioned structure and so being held securely thereon.

5,072,471

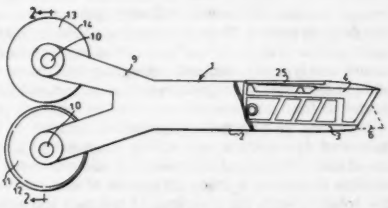
KNIFE WITH TWO WHEELS

Billy W. Isler, 4090 Bryan Blvd., Plantation, Fla. 33634

Filed Dec. 6, 1990, Ser. No. 623,117

Int. Cl.[5] B26B *11/00*

U.S. Cl. 7—158 **7 Claims**



1. A triple function hand tool comprising:

A) an elongate handle member having a long axis, adapted to be held and operated by one hand, and containing a hollow elongate internal compartment;

B) a cover member removably attached to said handle member for providing access to said compartment;

C) a blade carrier means for carrying a knife blade slidably within said compartment and for retractably extending said blade from a first end of said long axis of said handle member to provide for cutting a workpiece in a first function;

D) supporting means supporting two axles, said supporting means connected to a second end of said long axis of said handle member;

E) a first wheel rotatably mounted on a first one of said axles, said first wheel having a substantially convex edge for forcefully impressing a workpiece in a second function; and

F) a second wheel rotatably mounted on a second one of said

axles, said second wheel having a non-convex edge adapted for application to a workpiece in a third function.

5,072,472

CONTINUOUS PROCESS FOR DYEING A TEXTILE THREAD, AND INSTALLATION FOR THE IMPLEMENTATION OF THIS PROCESS

Robert Enderlin, Morschwiller Le Bas, France, assignor to Passap Knitting Machines, Inc., Salt Lake City, Utah

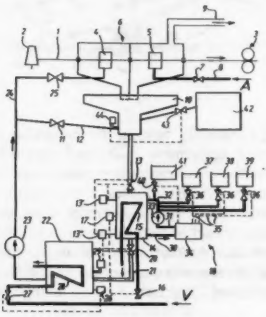
PCT No. PCT/FR88/00594, § 371 Date Aug. 7, 1989, § 102(e) Date Aug. 7, 1989, PCT Pub. No. WO89/05370, PCT Pub. Date Jun. 15, 1989

PCT Filed Dec. 5, 1988, Ser. No. 392,975

Claims priority, application France, Dec. 7, 1987, 87 17200

Int. Cl.[5] D06B *5/06, 15/09, 23/00*

U.S. Cl. 8—151.2 **21 Claims**



1. A continuous process for dyeing at least one textile thread by impregnation of the at least one textile thread with a dye solution comprising at least one base colorant dissolved in a solvent, said process comprising the steps of:

(a) providing said dye solution and heating said dye solution to a dyeing temperature of at least 60° C.;

(b) continuously introducing said dye solution into an impregnation enclosure;

(c) continuously passing said at least one textile thread through said dye solution in said impregnation enclosure and then through a flow of compressed air to expel a liquid residue of dye solution from said at least one thread;

(d) continuously recovering and mixing together excess dye solution from said impregnation enclosure and said liquid residue to form a recovered dye solution;

(e) performing an automatic colorimetric analysis of said recovered dye solution, and adding quantities of at least one of said colorant and said solvent to said recovered dye solution to achieve a color correction of said recovered dye solution, with the quantities of colorant and solvent being added being determined automatically by the results of the colorimetric analysis;

(f) preheating said recovered dye solution to a temperature close to said dyeing temperature; and

(g) reusing said recovered dye solution in step (a).

13. An installation for continuously dyeing at least one textile thread by impregnation of the at least one textile thread with a dye solution comprising at least one base colorant dissolved in a solvent, said installation comprising:

at least one impregnation enclosure;

at least one fluid extraction enclosure subsequent to said at least one impregnation enclosure to expel excess fluid from the at least one textile thread with compressed air;

means for passing at least one textile thread continuously through said at least one impregnation enclosure and said at least one fluid extraction enclosure; and

a dye solution circuit passing through said impregnation enclosure, said dye solution circuit comprising means for recovery of dye solution extending under said at least one impregnation enclosure and under said at least one fluid extraction enclosure to collect and mix together dye solution flowing therefrom, temperature control means for maintaining said dye solution at a dyeing temperature of at least 60° C., and automatic correction means associated with said means for recovery for controlling and correcting a quantity of each base colorant or solvent in recovered dye solution having been collected by said means for recovery.

5,072,473

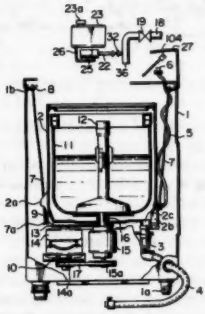
FULL-AUTOMATED WASHER

Sizuo Thuruta, Kitaibaraki; Yoshiaki Takeda, Hitachi; Isao Hiyama, Hitachi; Kenichi Kubo, Hitachi; Toshikazu Ohonishi, Hitachi; Hideyuki Tobita, Hitachi; Tamotu Shikamori, Ibaraki; Hiroshi Ohsugi, Hitachi; Hiroshi Kinoshita, Hitachi; Kazufumi Ikeda, Hitachi; Yoshio Ohwa, Kitaibaraki; Toshiyuki Hori, Hitachi; Masayoshi Hirayama, Hitachi, and Takeo Honma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 393,840, Aug. 14, 1989, which is a continuation of Ser. No. 198,204, May 25, 1988, abandoned, which is a division of Ser. No. 789,033, Oct. 18, 1985, Pat. No. 4,779,430. This application Jan. 28, 1991, Ser. No. 646,857

Int. Cl.[5] D00F *33/02*

U.S. Cl. 8—159 **12 Claims**



8. A washing machine comprising:

a washing drum into which cloth is to be placed to be washed;

a stirring blade rotatably supported in the washing drum;

an electric motor for rotating the stirring blade;

a water supply valve for supplying water to the washing drum;

a water drum valve for draining water from the washing drum;

a water level detecting sensor for detecting a water level in the washing drum and for producing a water level detection signal indicative of the detected water level in the washing drum;

a cloth amount detecting sensor for detecting an amount of cloth placed into the washing drum to be washed and for producing a cloth amount detection signal indicative of the detected cloth amount in the washing drum; and

an electrical control circuit for processing the water level detection signal to determine if the detected water level in the washing drum is equal to a selected water level, for processing the cloth amount detection signal to determine a necessary water level in the washing drum for properly washing the amount of cloth placed into the washing drum, and for controlling the electric motor, the water supply valve, and the water drain valve;

wherein the water level detecting sensor comprises an LC oscillator for producing the water level detection signal, and wherein the water level detection signal has a fre-

quency which varies in response to changes in the detected water level in the washing drum; and

wherein the electrical control circuit comprises:

a drive circuit for driving the electric motor, the water supply valve, and the water drain valve; and

a microcomputer for determining the frequency of the water level detection signal, and for controlling the electric motor, the water supply valve, and the water drain valve through the drive circuit;

wherein the microcomputer initiates a washing operation of the washing machine for washing cloth placed into the washing drum by performing the steps of:

controlling the water supply valve to supply water to the washing drum while processing the water level detection signal until the microcomputer determines that the water level in the washing drum is equal to a first selected water level;

controlling the electric motor to rotate the stirring blade while processing the cloth amount detection signal to determine the necessary water level in the washing drum for properly washing the amount of cloth placed into the washing drum, wherein the necessary water level is equal to or greater than the first selected water level;

if the necessary water level is greater than the first selected water level, controlling the water supply valve to supply water to the washing drum while processing the water level detection signal until the microcomputer determines that the water level in the washing drum is equal to a second selected water level which is equal to the necessary water level; and

controlling the electric motor to rotate the stirring blade to wash the cloth placed into the washing drum.

5,072,474

BRIDGE CONSTRUCTION

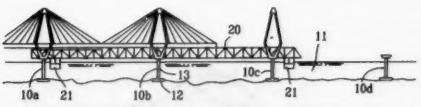
Walter H. Dilger, 592 Dalmeny Hill N.W., Calgary, Alberta, Canada T3A 1T6; Gamil S. Tadros, c/o #210, 2003 McKnight Blvd. N.E., Calgary, Alberta, Canada T2E 6L2; David Calder, c/o 145 West First Avenue, Vancouver, B.C., Canada V5Y 1A2, and Paul B. Giannelia, c/o 1177 - 11th Avenue S.W., Calgary, Alberta, Canada T2R 1K9

Filed Jul. 12, 1990, Ser. No. 551,861

Claims priority, application Canada, Jul. 12, 1989, 605489

Int. Cl.[5] E01D *11/00*

U.S. Cl. 14—1 **13 Claims**



1. In a method of constructing a cable-stayed bridge the steps of

(a) erecting a truss on a tower,

(b) extending at least one stay cable from an elevated location on the tower to a temporary connection to the truss,

(c) constructing a deck on the truss and effecting a connection of the cable to the deck,

(d) disconnecting the cable from the truss, and

(e) lowering the truss and hence the deck to tension the cable.

5,072,475

POLISHING PAD CLEANING APPARATUS

Alfred Rubiano, 3504 Bergenline Ave., Union City, N.J. 07087

Filed Jul. 23, 1990, Ser. No. 559,674

Int. Cl.[5] B08B *11/00*

U.S. Cl. 15—3 **2 Claims**

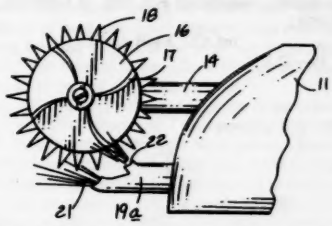
1. A polishing pad cleaning apparatus comprising,

a pneumatic gun housing, the housing including a pneumatic hose, the pneumatic hose arranged for directing pressurized air into the housing, and

a pneumatic conduit positioned exteriorly of the housing for receiving and directing pressurized air from the pneumatic gun housing, and

a switch member mounted to the housing to effect selective pressurizing of the pneumatic conduit, and

a support shaft mounted to the housing overlying the pneumatic conduit, the support shaft including a support axle mounted orthogonally through the support shaft, the support axle mounting a support disk thereon, the support disk including a continuous array of teeth members, the teeth members directed exteriorly and radially of the



support disk projecting exteriorly of the support disk an annular perimeter thereof, and

the pneumatic conduit including an outlet, the outlet positioned underlying and adjacent to the teeth members directing said pressurized air against said teeth members to effect rotation of the teeth members upon pressurized air being directed through the pneumatic conduit, and

wherein the outlet extends to a position adjacent the axle of the disk, and

including a further pneumatic outlet directed through the pneumatic conduit adjacent the pneumatic outlet, and a series of helical vanes mounted about an end surface of the disk radially arranged about the disk, with the further pneumatic outlet oriented towards the helical vanes.

5,072,476

APPARATUS FOR CLEANING PIPELINES FOR BEVERAGES AND THE LIKE

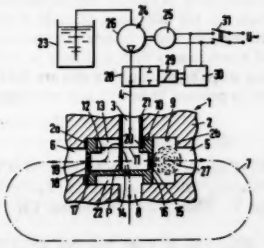
Friedrich Bersch, Industriestrasse 18, D-5401 Halsenbach, Fed. Rep. of Germany

Filed May 30, 1990, Ser. No. 530,911

Claims priority, application Fed. Rep. of Germany, May 30, 1989, 3917488

Int. Cl.[5] B08B *9/02*

U.S. Cl. 15—3.51 **9 Claims**



1. Apparatus for internally cleaning a pipeline having first and second ends with a liquid cleaning agent which conveys at least one cleaning element through the pipeline, comprising a shuttle valve including a body having an inlet for fresh cleaning agent, an outlet for spent cleaning agent, and first and second ports connectable with the respective ends of a pipeline to be cleaned, and a shuttle movable in said body by cleaning

agent between a first position in which said inlet and said outlet respectively communicate with said first and second ports and a second position in which said inlet and said outlet respectively communicate with said second and first ports; means for intermittently supplying cleaning agent to said inlet, said supplying means comprising a shutoff valve; and means for intermittently closing and opening said shutoff valve.

5,072,477

STRUCTURE OF MOTORIZED TOOTHBRUSH WITH SERVING PERIOD INDICATION

Chung-Jen Pai, No. 2, Lane 255, Sec. 2 Chung Shan Rd., Pan Chiao City, Taipei, Taiwan

Filed Jun. 1, 1990, Ser. No. 532,049

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1990, 9000747

Int. Cl.[5] **A46B** *13/02*

U.S. Cl. 15—22.1 **1 Claim**

1. A motorized toothbrush, comprising: a brush head comprising a plurality of bundles of bristles vertically fastened therein at one end, a plurality of projecting strips axially extending downwardly therefrom at the opposite end around a circle, a hole on the outer suface of said brush head, and an index near said projecting strips; a power unit comprising a housing, motor in the interior thereof, said motor being connected in series with a battery, a driving axle vertically extending upwardly from said housing and comprising a tenon horizontally extending therefrom at an upper position thereof, said motor driving said axle and causing said axle to rotate, a serving period indicating ring comprising teeth on its inner wall and markings around its periphery corresponding to said teeth and respectively for the indication of each of the months of a year; said driving axle being inserted in the projecting strips whereby said tenon enters into said hole in said brush head, said projecting strips enter said ring and are held by said teeth, and said index is pointed at one of said markings.

5,072,478

VERTICAL BLIND CLEANING MACHINE

Richard N. Wagner, 7105 Greengate Ct., Louisville, Ky. 40241, and George W. Ebert, 3017 Woodpine Cir., Sarasota, Fla. 34231

Filed Feb. 8, 1990, Ser. No. 477,278

Int. Cl.[5] **A47L** *1/02, 11/02*

U.S. Cl. 15—102 **15 Claims**

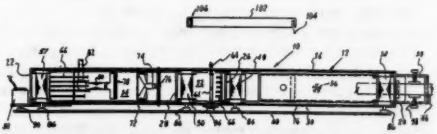
1. A vertical blind cleaning machine for cleaning both surfaces of individual blind panels comprising, in combination:

an elongated tank divided into liquid tight solution cleaning, rinse, and drying chambers;

a pair of feed rolls at the entrance end of each of said chambers and at the exit end of said drying chamber for successively and sequentially advancing blind panels through said solution cleaning chamber, rinse chamber and drying chamber;

a deflector in said cleaning chamber directing said panel to be completely immersed in cleaning solution in said solution cleaning chamber;

a pair of brushes in said cleaning chamber for contacting both surfaces of said panel;



spray means in said rinse chamber for spraying a liquid rinse medium against both surfaces of said pane;

liquid removal means in said drying chamber for removing liquid rinse medium from both surfaces of said panel; and,

a leader made of a material and to a length to span the distance between adjacent pairs of feed rolls, said leader having means for attachment to the forward end of a blind panel for guiding a fabric blind panel through said cleaning machine.

5,072,479

INTEGRALLY MOLDED SWEEPING IMPLEMENT

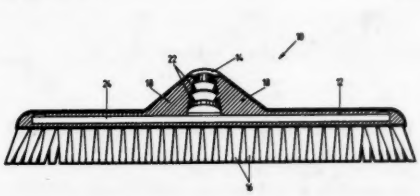
Gerhard A. Van Niekerk, Pretoria, South Africa, assignor to Climbminster Limited, Manchester, United Kingdom

Filed Jun. 15, 1990, Ser. No. 538,666

Claims priority, application South Africa, Jun. 26, 1989, 89/4819; Feb. 2, 1990, 90/0791

Int. Cl.[5] **A47L** *13/12;* **A46B** *1/00, 9/02;* **B25G** *3/14*

U.S. Cl. 15—111 **7 Claims**



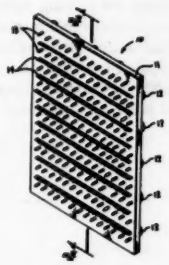
1. A sweeping implement comprising an elongated head having an upper surface and a lower surface, a socket on the upper surface for attaching the head to a broomstick, and bristles projecting from the lower surface, the bristles, the socket and the head being in the form of an integral moulding of a polymeric material, the socket being provided with resiliently flexible retaining means on its inner surface for counteracting the removal of the broomstick from the socket, said retaining means comprising at least one substantially frustoconically shaped ring tapering towards the base of the socket, the ring being adapted to form a vacuum which exercises a suction grip on the end of a broomstick inserted into the socket, when an attempt is made to remove the broomstick from the socket.

5,072,480

BACKBRUSH ASSEMBLY

Margery S. Peters, 1651 Desert Flower Dr., Las Vegas, Nev. 89115, and Ivor Waaka, 3 Dorothy Street, Pendle Hill, NSW 2145 Sydney, Australia 6881412

Filed Oct. 5, 1990, Ser. No. 594,608
Int. Cl.[5] A47K 7/02
U.S. Cl. 15—114 5 Claims



1. A backbrush assembly comprising,

a rigid support plate, the support plate formed with a fluid impermeable material, including a rear surface parallel to a forward surface, and

the rear surface including a matrix of suction cups mounted to the rear surface for securement of the support plate to a support wall, and

spaced parallel alternating rows of cleaning members, including first rows of resilient deformable polymeric projections and second rows of bristle brush members, wherein the first rows and second rows are in alternating and equally spaced relationship relative to one another, and

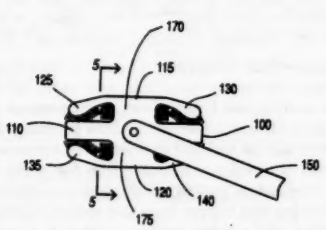
the first and second rows are of an equal predetermined length.

5,072,481

MULTI-SURFACE TOOTHBRUSH

Frank Weyer, 81 Toilsome Ave., Norwalk, Conn. 06851

Filed Nov. 13, 1989, Ser. No. 437,987
Int. Cl.[5] A46B 9/04
U.S. Cl. 15—167.2 10 Claims



1. A toothbrush for brushing plural tooth surfaces comprising:

a brush head comprising an elongated top brush having first and second opposite sides, a top and a bottom; a handle mounted to said top and a plurality of bristles fixed to said bottom and extending outwardly therefrom; an elongated first side brush resiliently fixed to the first side of said top brush by a first bridge section and an elongated second brush resiliently fixed to the second side of said top brush by a second bridge section; each of said side brushes being generally flexible;

each of said first and second side brushes being fixed to said top brush so as to extend generally normal to said top brush and extending outwardly from the bottom of said top brush; said first and second side brushes each having a side adjacent the bottom of the top brush and wherein the side of each side brush faces the other of the side brushes and wherein a plurality of bristles are fixed to the side of each side brush and extending outwardly therefrom; the top brush, first side brush and second side brush cooperatively define a generally U-shaped channel to accomodate a row of teeth;

said first side brush and second side brush each further comprising a straight central portion having opposite ends and wherein the straight central portion of the side brushes are generally parallel to the top brush; first and second free end portions fixed to the opposite ends of each central portion such that the first free end of each side brush is opposite the first free end of the other side brush and the second free end of each side brush is opposite the second free end of the other side brush; said free end portions of each side brush being curved toward the opposing free end portion of the other side brush; the bristles of said side brushes being affixed to both the central portions and free end portions;

said straight central portions of said side brushes being separated by a first distance and the opposing free ends of the side brushes being separated by a second distance, said first distance being greater than said second distance;

such that when the head is applied to a row of teeth such that teeth are disposed in said channel, said first distance is adjusted to adapt to varying diameters of teeth between the ends of the straight central portions of the side brushes and said second distance is adjusted to adapt to varying diameters of teeth between the free ends of the first and second side brushes; said adjusting of the first distance being possible by virtue of the resilient connection between the side brushes and top brush and said adjusting of the second distance being possible by virtue of the flexible nature of the side brushes themselves.

5,072,482

END BRUSH WITH MALE PROJECTION, APPARATUS AND METHOD FOR MAKING SAME, AND APPARATUS FOR USE THEREOF

James A. Bojar, Wauwatosa, and Richard J. Shaw, Hartland, both of Wis., assignors to Professional Dental Technologies, Inc., Batesville, Ark.

Filed Aug. 31, 1989, Ser. No. 402,341
Int. Cl.[5] A46B 1/00; A46D 1/04
U.S. Cl. 15—180 4 Claims

1. An end brush comprising:

a plurality of generally parallel fibers bundle to form a brush having first and second ends; and, a base formed at said first bundle end by solidifying said fibers, said fibers extending away from said base and terminating in said second end, the base having a first portion disposed in a plane substantially perpendicular to the fibers and a projecting portion extending from said first position in a direction opposite to said fibers, said projecting portion being of smaller diameter than said first portion, and having means for connecting the base to a means for rotating the brush, the projecting portion having a protrusion extending perpendicular to the projecting portion, for connecting the base to a means for rotating the brush, the protrusion

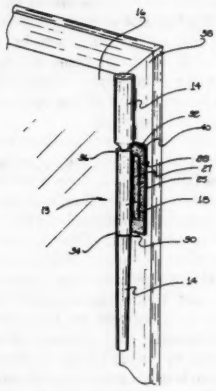
spaced away from and substantially parallel to the first portion of the base.

5,072,483

ERASER

Roger Durand, #10 Antler Lake, 52343 Range Road, Sherwood Park, Alberta, Canada T8G 1A6

Filed Aug. 30, 1989, Ser. No. 400,724
Claims priority, application Canada, Feb. 27, 1989, 592239
Int. Cl.[5] B43L *19/00*
U.S. Cl. 15—210 R **1 Claim**



1. An eraser, comprising:

a) a body having a planar surface substantially equal to the width of the body and extending substantially the length of the body;

b) a cloth covering mounted to and covering substantially all of the planar surface of the body, the cloth covering being of uncut nylon pile thereby serving both as a medium for erasion and a means for permitting the body to be secured to an object having a mating tape fastener of hook-like nylon pile; and

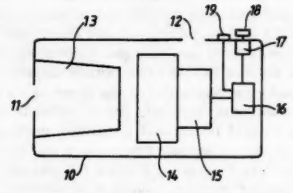
c) the body having opposed ends with an aperture at each end, the apertures being of different sizes thereby permitting the body to accommodate in mating engagement differing sizes of writing instruments.

5,072,484

VACCUM CLEANER SUCTION CONTROL

Leif E. Edlund, Upsala, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

PCT No. PCT/SE90/00049, § 371 Date Oct. 11, 1990, § 102(e) Date Oct. 11, 1990, PCT Pub. No. WO90/09138, PCT Pub. Date Aug. 23, 1990
PCT Filed Jan. 24, 1990, Ser. No. 582,946
Claims priority, application Sweden, Feb. 14, 1989, 8900503
Int. Cl.[5] A47L *9/28*
U.S. Cl. 15—319 **10 Claims**



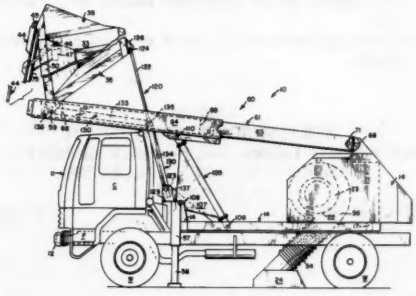
1. Arrangement for a vacuum cleaner provided with an electric motor (15) and a suction fan (14) connected to said motor, comprising a control device (15) provided to have the motor operate in a speed range which is limited upwards by a rated voltage corresponding to a rated power level for the motor, manually operable means (19) for activating coupling means (46, 39; 30, 31) provided to temporarily connect the motor (15) to a voltage exceeding said rated voltage resulting in operation of the motor at an increased power level during a predetermined time, said coupling means including a thermally-operated means (46; 30) for determining of said predetermined time, and means for heating said thermally-operated means initiated by operation of said manually operated means, said thermally operated means allowing operation of said coupling means when heated less than said predetermined time, and prohibiting operation of said coupling means after having been heated for said predetermined time.

5,072,485

SURFACE SWEEPING MACHINE WITH OVER-THE-CAB HOPPER DUMPING

Gary B. Young, Waco; Albert L. Hanel, Eddy, and Kenneth R. Veselka, Axtell, all of Tex., assignors to Tymco, Inc., Waco, Tex.

Filed Apr. 29, 1988, Ser. No. 188,521
Int. Cl.[5] B60P *1/04;* E01H *1/08*
U.S. Cl. 15—346 **19 Claims**



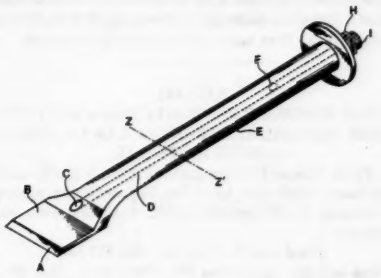
1. A dump vehicle comprising a frame having a longitudinal axis, a hopper carried by said frame, said frame carries a cab, means for moving said hopper from a first position generally contiguous said frame to a second position generally above said cab and remote from said first position along a generally longitudinal path of travel in a first direction and along the same generally longitudinal path of travel in a second opposite direction for moving said hopper from said second position to said first position, said moving means including first and second elongated extendable and retractable members, said elongated members each having a longitudinal axis, said elongated member longitudinal axes each being in substantial parallel relationship to said longitudinal path of travel, means for connecting said hopper to said first member, means for articulately connecting said second member to said frame, means for selectively relatively extending and retracting said members relative to each other to respectively move said hopper from said first position to said second position and vice versa, a control arm, and means for articulately connecting said control arm to one of said members and to said frame thereby imparting a generally arcuate component of movement to said hopper moving means during movement of said hopper moving means along said longitudinal path of travel.

5,072,486

GAS ASSISTED SCRAPER

Steve Guarascio, 253-08, 147th Rd., Rosedale, N.Y. 11422

Filed Apr. 17, 1990, Ser. No. 510,169
Int. Cl.[5] A47L 9/06, 9/08
U.S. Cl. 15—401 16 Claims



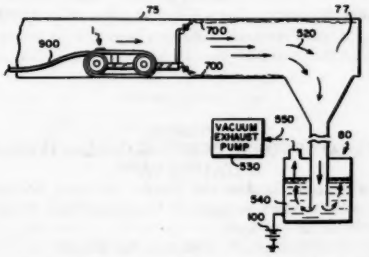
1. A gas assisted scraper which comprises:
(a) a handle having a passageway therein, the passageway having an end capable of being attached to a source of gas;
(b) a scraping portion connected to the handle and having a scraping edge configured in such a manner so as to permit the scraping of a surface by the scraping edge by pushing the handle with a force in a generally forward direction over the surface, the scraping portion, scraping edge and handle being generally aligned in a direction parallel with the force applied to the handle during scraping of a surface;
(c) a gas outlet connected to the passageway at the end opposite the end capable of being attached to a source of gas and proximate to the scraping edge, the gas outlet being configured so as to direct gas in a forward direction toward the scraping edge generally parallel to the force applied to the handle;
(d) means for supplying a gas to the gas outlet; and
(e) a shield connected to the handle.

5,072,487

DUCT CLEANING APPARATUS

James F. Walton, W. Boxford, Mass., assignor to J. F. Walton & Co., Inc., Chelsea, Mass.

Continuation-in-part of Ser. No. 389,743, Aug. 4, 1989, Pat. No. 5,020,188. This application Nov. 21, 1990, Ser. No. 616,379
Int. Cl.[5] B08B 9/04
U.S. Cl. 15—406 8 Claims



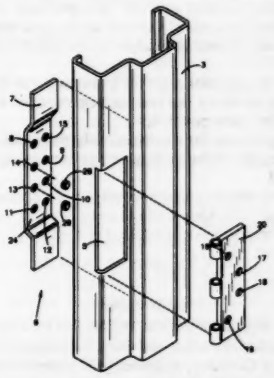
7. An apparatus for traversing a conduit and cleaning and disinfecting it from within, said apparatus comprising:
a carriage;
means attached to the carriage for supporting the carriage in the conduit;
means attached to the carriage for moving the carriage through the conduit;
a plurality of high pressure nozzle means supported by a plurality of nozzle mounting means mounted on the carriage, each of the said nozzle means comprising a nozzle head rotatably mounted on a shaft, the head having a plurality of nozzle apertures, said shaft including a central aperture axially aligned within the shaft, engagement of the nozzle head with the central aperture defining therein a feed canal, and wherein said central aperture, feed canal and nozzle aperture are in communication for receiving and transmitting fluid;
means for preventing fluid turbulence within the spray nozzle head of each nozzle means;
means for disinfecting the conduit mounted on the carriage;
means for controlling the apparatus connected to the carriage; and
means for providing air and other cleaning and disinfecting fluids to the high pressure nozzle means for disbursal therethrough.

5,072,488

METHOD AND APPARATUS FOR MOUNTING HINGES TO A DOOR FRAME

Rodney W. Winyard, Leavittsburg, Ohio, assignor to Amweld Building Products, Inc., Garrettsville, Ohio

Filed Mar. 14, 1990, Ser. No. 494,141
Int. Cl.[5] E05D 7/06, 7/04
U.S. Cl. 16—241 7 Claims



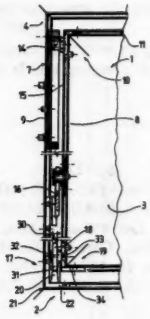
1. A hinge preparation assembly for mounting either standard weight or heavy weight hinges to a door frame having a hinge jamb provided with vertically spaced hinge cut-out sections and a strike jamb, said assembly comprising:
a hinge reinforcing plate bridging each cut-out section, said plate having a planar mounting surface recessed from the surface of said hinge jamb a distance that is greater than the thickness of a standard weight hinge leaf, but less than the thickness of a heavy weight hinge leaf;
each of said plates having a plurality of threaded screw holes and at least one set screw adapted to adjustably project from the surface of said plate;
said set screws being mounted in certain of said screw holes, whereby standard weight hinge leaves secured to said plates by screws extending into said screw holes will engage the ends of said set screws and will rest at an angle to the plane of the mounting surface, said set screws adapted to be threaded in and out to adjust door clearance by varying said angle; and
said set screws being either removable or adjustable flush with the surfaces of said plates to permit heavy weight hinge leaves to be secured in abutting contact to said mounting surface.

5,072,489

HINGE FOR DOOR OR WINDOW, THE LEAF FRAME OF WHICH IS PARTIALLY OVERLAPPING THE SASH-FRAME

Laurent Aumercier, Phalsbourg, France, assignor to Ferco International Usine De Ferrures De Batiment, Sarrebourg, France

Filed May 21, 1990, Ser. No. 525,700
Claims priority, application France, Jun. 2, 1989, 89 07501
Int. Cl.[5] E05D *15/06*
U.S. Cl. 16—361 13 Claims



1. Hinge for a sash and sash-frame, the sash includes two side stiles, an upper rail and a lower rail, partially overlaps the sash-frame, and is outwardly tiltable to an open position about a horizontal axis located at a height of the upper rail, said hinge comprising:

hinged lower compass arms for imparting a path with vertical components to the sash at beginning of tilting of the sash to the open position;

upper hinge means for simultaneously outwardly projecting the upper rail of the sash during vertical movement of the sash; and

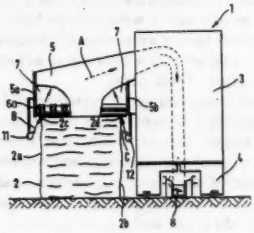
assistance means for simultaneously at completion of closing of the sash effecting vertical and centering movement of the sash to position and center the sash with respect to the sash frame.

5,072,490

FIBER BALE OPENER WITH BLOW NOZZLE

Ferdinand Leifeld, Kempen, and Josef Temburg, Jüchen, both of Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Oct. 12, 1990, Ser. No. 597,692
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1989, 3934039
Int. Cl.[5] D01G *7/00*
U.S. Cl. 19—80 R 11 Claims



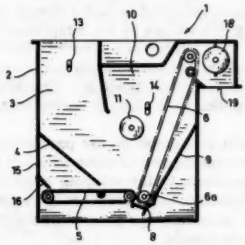
1. In a bale opener including a housing, means for effecting travel of the housing along a travelling path, an opening roll mounted in the housing for removing fiber tufts from faces of fiber bales arranged in a series along the travelling path; the opening roll having a longitudinal axis lying in a plane oriented perpendicularly to the travelling path; and a suction means generating a suction stream within the housing for removing, from a zone of the opening roll, fiber tufts detached by the opening roll from the fiber bales; the improvement comprising pressurized air stream generating means for blowing air from a location outside the housing in an upwardly inclined direction into said housing for essentially preventing fiber material from dropping off the fiber bales over upper edges thereof.

5,072,491

HOPPER FEEDER FOR PRODUCING A MIXTURE OF FIBER, MATERIAL, IN PARTICULAR OF TEXTILE FIBER MATERIAL

Akiva Pinto, Duesseldorf; Guenter Lucassen, Haltern, and Bernhard Bocht, Neubulach, all of Fed. Rep. of Germany, assignors to Hergeth Hollingsworth GmbH, Duelman, Fed. Rep. of Germany

Filed Apr. 9, 1990, Ser. No. 507,424
Claims priority, application PCT Int'l Appl., Oct. 10, 1987, PCT/EP8800871
Int. Cl.[5] D01G *23/04*
U.S. Cl. 19—145.5 12 Claims



1. A hopper feeder for producing a mixture of textile fiber material, said hopper feeder being of the type which includes a chute which is fed textile fiber from a reciprocating feed means, a bottom conveyor belt disposed at a lower edge of said chute, and a reduction assembly projecting upwardly from said bottom conveyor belt in a working direction, wherein said feeder comprises an inclined surface disposed in a lower portion of said chute extending from a wall of said chute in said working direction of said bottom conveyor belt, said inclined surface extending downwardly and approximately as far as a half the length of said bottom conveyor belt, said inclined surface terminating above a transition point from said bottom conveyor belt to said reduction assembly, and a freely rotatable roller disposed within a filling chamber of said feeder in working relation with said reduction assembly for acting on a column of fiber material processed by said production assembly.

5,072,492

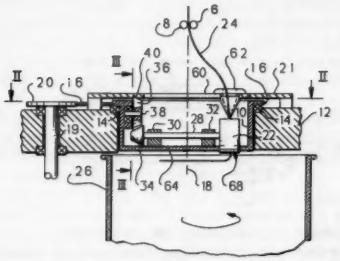
APPARATUS FOR DEPOSITING CARD SLIVERS IN ROTATING CANS

Roberto Roccon, Bürglen, and Martin Schwager, Winterthur, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Apr. 27, 1990, Ser. No. 515,587
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1989, 3913998
Int. Cl.[5] B65H *54/80*
U.S. Cl. 19—159 R 17 Claims

1. Can filling apparatus comprising a head part which is arranged in operation above a rotatable can and a rotary plate driveable to execute a rotational movement, with the rotary plate depositing a fiber band in continuous cycloidal loops into

the can by means of two calender rolls which are journalled on the rotary plate via at least substantially horizontal axes, wherein at least one of the calendar rolls is driveable by a friction wheel which is rotatably journalled on the rotary plate and runs around a fixed ring surface of the head part, characterized in that the imaginary axis about which the friction wheel turns is arranged fixed in space relative to the rotary plate and the friction wheel has a conical surface which rolls off on a complementary conical ring surface of a window ring;



and in that the friction wheel can be adjusted or biased in the direction of the imaginary axis into engagement with the window ring and drives the calender roller associated with the friction wheel directly or via a shaft representing the rotational axle of the calendar roller, optionally via a conical wheel arranged between the friction wheel and the shaft or between the friction wheel and the calender roller; one of said calender rollers being a depositing roller which simultaneously deposits the fiber band directly onto the layers of fiber band already present in the can.

5,072,493

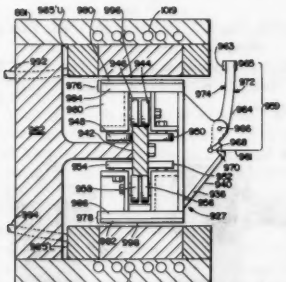
APPARATUS FOR DRAWING PLASTIC FILM IN A TENTER FRAME

William J. Hommes, Hockessin, and John J. Keegan, Jr., Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 209,910, Jun. 22, 1988. This application Nov. 13, 1990, Ser. No. 611,634

Int. Cl.[5] D06C *3/08*

U.S. Cl. 26—72 **2 Claims**



1. An apparatus for drawing a web of plastic film by propelling individual carriages having tenter clips attached thereto at predetermined speeds in opposed loops defined by a pair of carriage guide tracks positioned opposite each other, using linear motors, such apparatus includes:

first elongated primaries positioned opposite each other on forward sides of the loops;

second elongated primaries positioned opposite each other on return sides of the loops;

a plurality of active carriages guided around the tracks, each having a synchronous secondary attached thereto positioned adjacent the first primaries for propelling the active carriages, synchronously, in pairs, at predetermined speeds, in a film processing section of the tenter frame to draw the film gripped by the tenter clips;

each of the active carriages further having a hysteresis secondary attached thereto positioned adjacent the second primaries for propelling the active carriages in and through stack forming sections and into stacks of carriages on the return sides of the loops.

5,072,494

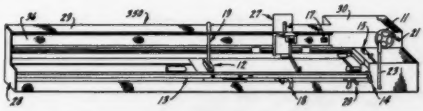
METHOD AND APPARATUS OF INFINITELY SIZING A MINI BLIND

Delbert B. Graves, Nora, and Roger L. Anderson, McConnell, both of Ill., assignors to Newell Operating Company, Freeport, Ill.

Continuation-in-part of Ser. No. 234,709, Aug. 19, 1988, Pat. No. 4,993,131. This application Oct. 10, 1990, Ser. No. 595,359 The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.[5] B23D *19/04*

U.S. Cl. 29—24.5 **12 Claims**



1. A manual method of sizing a mini-blind having a plurality of slat means and a first ladder means at an undisturbed end of said slat means and a second ladder means at a cuttable end of said slat means to an exact, specified width at the time of purchase by an operator, said method including the steps of:

locating the second ladder means at the cuttable end of the mini-blind in a position remote from the final position of the ladder cord,

forming the mini-blind into a rigid structure,

forming an aperture through the rigid structure for a ladder cord for the second ladder means,

sizing the mini-blind to the specified width by separating excess mini-blind material from the balance of the mini-blind by the application of a manually applied lever-assisted force to the rigid mini-blind structure,

positioning several of the ladder links of the second ladder means on each side of the aperture, and

threading a ladder cord through the aperture and securing it in fixed relationship to the lower portion of the slat means.

5,072,495

INSTALLATION FOR AUTOMATIC ASSEMBLY OF SOCKET-BRACKET

M. J. Kautt, Strasbourg, France, assignor to Ferco International Usine De Ferrures De Batiment, Sarrebourg, France

Filed Jun. 18, 1990, Ser. No. 539,342

Claims priority, application France, Jun. 21, 1989, 89 08291

Int. Cl.[5] B23P *19/06;* **B23Q** *41/02*

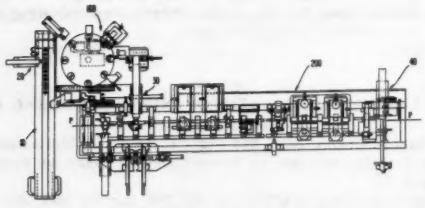
U.S. Cl. 29—33 K **20 Claims**

1. Installation for the automatic equipping and assembly of elementary parts, in particular parts forming a socket-bracket, formed of a hinge socket with an upper and lateral adjustment screws and a plastic material stop, and a bracket, these two assembled parts forming a right-angle bracket intended to be housed in a rabbet of an opening leaf, particularly an oscillating leaf, the socket being intended to cooperate with an angle support fixed to the frame, which installation comprises an installation for automatically equipping the socket having a rotary step by step bed-plate presenting the socket to:

a station having means for distributing and positioning the upper adjustment screw,

a station having means for distributing and positioning the lateral adjustment screw,

a station having means for checking positioning of the two adjustment screws,



characterized in that, with this installation (**100**) for automatically equipping the socket (**1**) is associated an installation (**200**) for automatically assembling the bracket (**5**) on the socket (**1**), via an automatic transfer mechanism (**30**).

5,072,496

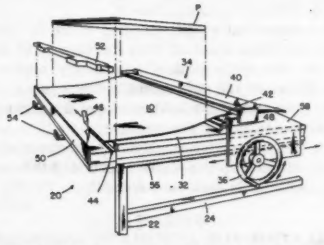
A METHOD OF FABRICATING A CLOTH-COVERED PANEL

Roger Radermacher, 10321 N.E. 201st. Pl., Bothell, Wash. 98011

Continuation of Ser. No. 410,293, Sep. 21, 1989, Pat. No. 5,014,408. This application Sep. 25, 1990, Ser. No. 588,010

Int. Cl.[5] **B68G** *7/00*

U.S. Cl. 29—91.1 **3 Claims**



1. A method of fabricating a cloth-covered panel having a rigid frame comprising:

a. providing a rectangular panel framework having a pair of long parallel edges and a pair of short parallel edges, including a groove along at least one of the long edges;

b. placing fabric at least as wide as a panel is long upon a smooth surface and exposing at least enough fabric to cover the width of the panel;

c. placing the panel on top of the fabric adjacent the lead edge of the fabric with the groove facing the lead edge of the fabric;

d. securing the lead edge of the fabric by forcing it into the groove of the panel;

e. folding the fabric over the second edge of the panel and extending it over the top of the panel;

f. securing the fabric to the frame by forcing it into the groove; and

g. locking the fabric to the panel.

5,072,497

GLAZING OR CALENDERING ROLL

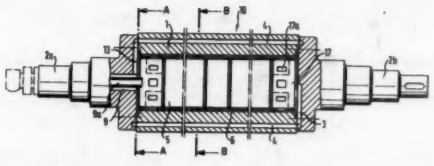
Heinz-Michael Zaoralek, and Erich Vomhoff, both of Königsbronn, Fed. Rep. of Germany, assignors to Schwabische Huttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Apr. 27, 1990, Ser. No. 515,818

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1990, 9000980[U]

Int. Cl.[5] **B21B** *31/08*

U.S. Cl. 29—123 **4 Claims**



1. A glazing or calendering roll comprising:

a roll body having ends and a central portion, said roll body having

a flange journal at each end of the roll body,

peripheral passages, extending in an axial direction between said ends of the roll body, formed near a roll surface in the roll body for conducting a fluid heat or cold carrier through a peripheral region of the roll body,

a central bore in the roll body wider in diameter than a diameter of the peripheral passages,

a displacement body arranged in the central bore, and

an annual gap extending axially through the central portion of the roll body, said annular gap formed between an inner wall of the central bore and outer wall of the displacement body, for conducting the fluid heat or cold carrier through said central portion of said roll body.

5,072,498

METHOD OF MANUFACTURING A DIFFUSION AND/OR FILTRATION APPARATUS

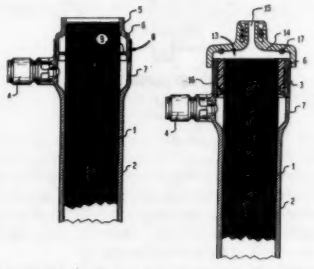
Manfred Raff, Bisingen/Thanheim, and Kurt Spranger, Ammerbuch/Entirgen, both of Fed. Rep. of Germany, assignors to Gambro Dialysatoren GmbH & Co. KG, Fed. Rep. of Germany

Division of Ser. No. 237,504, Aug. 26, 1988. This application Mar. 13, 1991, Ser. No. 668,629

Claims priority, application Sweden, Aug. 31, 1987, 8703368

Int. Cl.[5] **B23P** *19/04;* **B22D** *11/126*

U.S. Cl. 29—163.8 **9 Claims**



1. A method of manufacturing a diffusion/filtration apparatus comprising the steps of:

a) providing a bundle of semi-permeable hollow fibers, said bundle of hollow fibers having a first end and a second end;

b) providing a housing which defines a longitudinally extending internal chamber including a first open end and a second open end;

c) inserting said bundle of hollow fibers into said internal chamber;

d) providing an annular ring member open at both ends and having a shape corresponding to said housing, and inserting said ring member into at least one of said first and second open ends of said internal chamber between said housing and said bundle of hollow fibers;

e) inserting a predetermined quantity of a potting material, which when set has a lower coefficient of adhesion with respect to said ring member than it coefficient of adhesion with respect to said housing, into said first and second open ends of said housing and into one of said open ends of said ring member thereby penetrating into said internal chamber a first predetermined distance and into said hollow fibers a second predetermined distance, whereby the outer periphery of said potting material contacts said ring member and seals said internal chamber from said ends of said hollow fibers;

f) cutting said housing, said ring member and said hollow fibers transverse to said internal chamber at a predetermined point between said first and second predetermined distances thereby opening said hollow fiber and providing an end wall in contact with at least a portion of said ring member supporting said ends of said hollow fibers; and

g) attaching lid means over said first and second end of said housing.

5,072,499

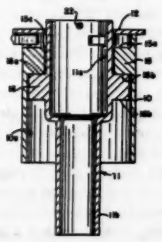
STARTER SPRING REWINDER

Wayne A. Scott, Rte. 1, Box 48, Sannemin, Ill. 61769

Continuation of Ser. No. 272,489, Nov. 11, 1988, abandoned. This application Dec. 22, 1989, Ser. No. 455,037

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—228 **9 Claims**



1. A rewinder for compressibly rewinding a spring of concentric coils comprising:

a tubular housing which is open at a top and a bottom end with a chamber defined by an interior sidewall;

an inboard annular shoulder formed around the housing interior adjacent said housing top end, said inboard shoulder having a generally planar top surface extending in a plane generally perpendicular to a longitudinal chamber axis, and a bottom bearing surface;

a winder rotatably received within said housing having a hand-graspable handle extending out of said housing bottom end, an outboard annular shoulder formed around said winder, said outboard winder shoulder bearing against said inboard shoulder bottom bearing surface, and a winding stem portion defined on said winder extending through and beyond said inboard shoulder top surface toward said housing top;

said winder stem portion, inboard shoulder top surface and housing interior sidewall combining to form a generally annular rewinding compartment;

means formed on said winder stem portion for receiving and gripping an inboard spring end;

an aperture formed through said housing at about the level of said inboard shoulder top surface through which the spring passes in rewinding;

means for retaining the spring within said compartment during rewinding;

a cover overlying said compartment; and

a means on said winder for releasably retaining said cover in place.

5,072,500

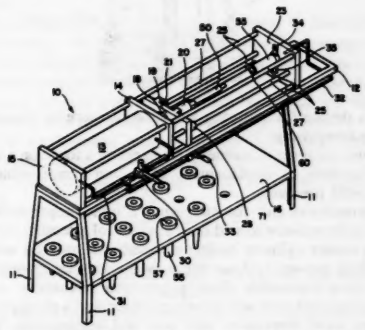
APPARATUS FOR REMOVING A COVER FROM AND APPLYING A COVER TO A TOP ROLL MANDREL

Robert Wagner, Rte. 3, Box 369-5, Goldsboro, N.C. 27530

Filed Sep. 14, 1990, Ser. No. 583,038

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—234 **4 Claims**



1. An apparatus for removing a cylindrical tubular elastomeric cover from and applying a cylindrical tubular elastomeric cover to a cylindrical top roll mandrel of a top roll, comprising:

(a) attachment holding means for holding a selected cover removing or cover applying attachment;

(b) a cover applying attachment for being held by said attachment holding means and for carrying a top roll cover to be applied to said top roll mandrel;

(c) a cover stripping attachment for being held by said attachment holding means and for stripping a cover from a top roll mandrel, said cover stripping means comprising a tube having an inner diameter slightly greater than the outer diameter of the top roll mandrel and substantially smaller than the outer diameter of the cover whereby when the tube is forced against one end of the top roll and wedged under the cover, the cover is progressively stripped from the top roll mandrel s the top roll mandrel passes into said tube;

(d) top roll holding means for holding a top roll mandrel with a cover to be removed by the cover stripping attachment or a top roll mandrel without a cover for receiving a cover applied by said cover applying attachment;

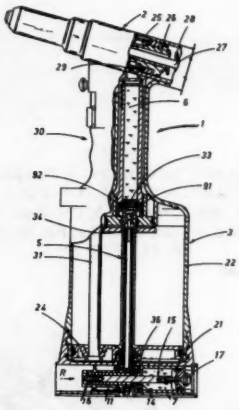
(e) top roll movement means for holding a top roll mandrel for reciprocal movement to and from said attachment holding means and the cover applying attachment or the cover stripping attachment held by said attachment holding means to thereby apply a cover to or remove the cover from the top roll mandrel.

5,072,501

DEVICE FOR RESTORING LOST FLUID PRESSURE PARTICULARLY IN RIVETING MACHINES

Cariati Vincenzo, Bologna, Italy, assignor to FAR S.n.c. di Generali Giacomo, Bologna, Italy

Filed Nov. 5, 1990, Ser. No. 609,406
Claims priority, application Italy, Nov. 17, 1989, 3707 A/89
Int. Cl.[5] B21J *15/22*
U.S. Cl. 29—243.525 8 Claims



1. A device for restoring lost fluid pressure in riveting machines comprising:

a fluid power tool assembly for exerting a force on a rivet in response to displacement of a non-compressible fluid under pressure;

a propulsion unit for supplying a non-compressible fluid under pressure to said fluid power tool assembly including a master cylinder having a chamber connected with said fluid power tool assembly, said chamber containing a non-compressible fluid, a powered pneumatic cylinder connected with said master cylinder, and a plunger having an axial dimension and one end reciprocally located within said pneumatic cylinder and an opposing end reciprocably located within and in fluid-tight association with the chamber of said master cylinder, wherein said powered pneumatic cylinder when actuated moves said plunger to effect displacement of said non-compressible fluid and to power said power tool assembly; and

fluid pressure restoration means for restoring fluid pressure lost during operation of the fluid power tool assembly including a reserve chamber or reservoir interconnectable with the chamber of said master cylinder, said reserve chamber or reservoir containing a non-compressible fluid, and mechanically actuated non-return means located along the axial dimension of said plunger and between said reserve chamber or reservoir and the chamber of said master cylinder.

5,072,502

METHOD AND APPARATUS FOR APPLYING SLIDE FASTENER END STOP

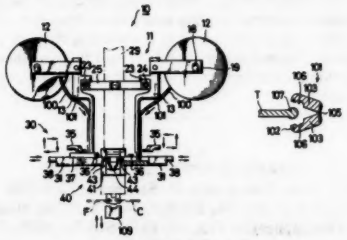
Minoru Hirota, Uozu; Kazuki Kuse, Toyama, and Keiichi Keyaki, Kurobe, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 25, 1991, Ser. No. 691,436
Claims priority, application Japan, Apr. 27, 1990, 2-110099; Jun. 21, 1990, 2-161292; Jan. 22, 1991, 3-81069
Int. Cl.[5] A41H *37/06;* B21D *53/52*
U.S. Cl. 29—408 6 Claims

1. A method of feeding and applying end stops to a slide fastener chain which comprises the steps of winding upon a cartridge-type reel, an elongated strip formed from a synthetic plastic material and having a succession of serially interconnected prospective end stops and a plurality of flexible connecting cords interconnecting adjacent ones of said end stops in spaced apart relation; advancing said strip by a pitch corresponding to one of the end stops; cutting a leading one of said end stops from said strip across said connecting cords; folding the thus cut leading end stop centrally about its transverse axis; transferring the thus folded leading end stop to an end stop applying station; and clamping the same astride over one longitudinal edge of a slide fastener tape.

2. An apparatus for feeding and applying end stops to a slide fastener chain which comprises

(a) a reel stocker unit including at least one reel having wound thereon an elongated strip formed from a synthetic plastic material and having a succession of serially interconnected prospective end stops and a plurality of flexible connecting cords interconnecting adjacent ones of said end stops in spaced apart relation; a reel stocker releasably mounting said reel thereon and having a vertical guide channel for the passage of said strip; a reel stocker holder releasably holding said reel stocker thereon and movable



horizontally reciprocally toward and away from a predetermined position;

(b) a transfer table unit including a table having a vertical guide slit dimensioned to receive one end stop from said reel stocker, and a horizontal guide groove communicating with said guide slit and extending longitudinally of said table; a transfer finger reciprocally movable horizontally to engage said connecting cords of said strip and vertically to bring a leading end stop onto said table; a cutter movable reciprocally horizontally for cutting off said leading end stop across said connecting cords; and a pusher movable reciprocally horizontally in and along said guide groove and adapted to cause said leading end stop to fold about its transverse axis;

(c) a parts applying unit including a parts holder movable arcuately toward and away from the path of the slide fastener chain and having a pocket for receiving said end stop, which has been folded, from said table and transfering the same onto the slide fastener chain; and

(d) a means of clamping said folded end stop onto a beaded edge of a slide fastener tape with heat and pressure.

5,072,503

METHOD FOR DISASSEMBLING AN INNER SOCKET ASSEMBLY

Michael L. Milletics, Enhaut, Pa., assignor to Milletics, Bell and Clower, Enhaut, Pa.

Filed Jan. 8, 1990, Ser. No. 462,144
Int. Cl.[5] B23P *19/00*
U.S. Cl. 29—426.5 6 Claims

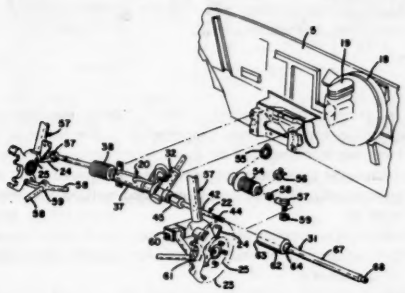
1. A method of disassembling an inner socket assembly from a rack and pinion mechanism, the assembly and mechanism comprising a rack having spaced-apart open axial ends; a rack tube projecting through the rack axially thereof and having end projecting beyond an axial end, said projecting end having outwardly directed threads; a ball and socket joint housing with inward directed threads threaded with said outwardly

directed threads of the rack tube end; a bulkhead within the housing dividing the housing into two chambers, a first chamber encompassing the threaded end of the rack tube, and a second chamber forming an inner socket; a tie rod with first ball shaped end fitted within said inner socket to form a ball and socket joint and second end rotatably attached to a knuckle arm; the method comprising:

disengaging the tie rod from the knuckle arm;

encircling the tie rod with an adapter socket sleeve;

advancing the adapter socket sleeve transversely along the length of the tie rod from the knuckle joint end to the ball end at the ball and socket joint housing;



engaging the ball and socket joint housing with a first end of the adapter socket sleeve;

encircling the tie rod with an elongated cylindrical shaft;

advancing the elongated cylindrical shaft transversely along the length of the tie rod from the knuckle joint end toward said ball and socket joint;

engaging a first end of the cylindrical shaft to a second end of the said adapter socket sleeve; and

applying a torque force to the second end of the cylindrical shaft to rotate both said shaft and adapter socket sleeve whereby the ball joint housing is rotated, loosened and removed from the rack tube.

5,072,504

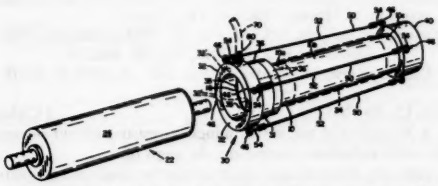
METHOD FOR AXIALLY MOUNTING AND DISMOUNTING RIGID SLEEVES ONTO, AND FROM, CYLINDERS

William L. Thompson, Vancouver, Wash., assignor to International Composites Corporation, Vancouver, Wash.

Division of Ser. No. 293,131, Jan. 3, 1989, Pat. No. 4,979,278. This application Feb. 1, 1990, Ser. No. 474,520

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—426.6 **20 Claims**



1. A method for axially mounting and dismounting a high strength sleeve, having excellent structural integrity, onto, and from, a cylinder, said method comprising:

providing said sleeve and said cylinder, said sleeve having a longitudinal dimension equal to or less than the longitudinal dimension of said cylinder and an inner diameter less than the outer diameter of said cylinder;

providing external fluid transmission means for attachment to the first end of the sleeve, said external fluid transmission means defining a first hollow inner chamber;

providing connecting means for engaging the second end of the sleeve to connect said external fluid transmission means to said sleeve, said connecting means defining a second hollow inner chamber;

locating said first end of said sleeve within said first hollow inner chamber;

locating said second end of said sleeve within said second hollow inner chamber;

attaching said external transmission means to said connecting means with a plurality of fasteners for maintaining said sleeve in position between said external transmission means and said connecting means;

inserting a first end of said cylinder through an opening in said external fluid transmission means until said first end of said cylinder abuts said first end of said sleeve;

introducing a pressurized fluid, from said external fluid transmission means, between said sleeve and said cylinder, thereby causing radial expansion of said sleeve;

mounting said expanded sleeve axially about said cylinder;

terminating the introduction of pressurized fluid between said sleeve and cylinder, thereby allowing said sleeve to contract about said cylinder;

removing said cylinder, with said sleeve mounted thereon, from within said first and second hollow inner chambers; and

dismounting said sleeve from said cylinder by inserting said cylinder, with said sleeve in surrounding engagement about said cylinder, between said first and second hollow inner chambers, attaching said external fluid transmission means to said connecting means with said plurality of fasteners, introducing pressurized fluid, from said external fluid transmission means, between said sleeve and said cylinder, thereby causing radial expansion of said sleeve, and removing said expanded sleeve from about said cylinder.

5,072,505

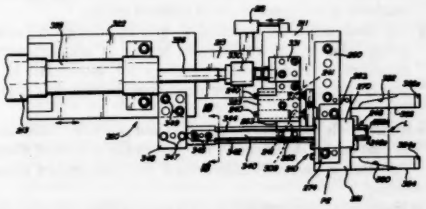
METHOD FOR ASSEMBLING A RETAINER RING ONTO AN ARTICLE

Deryll Liechty, Berne, Ind., assignor to Micro-Precision Operations, Inc., Berne, Ind.

Division of Ser. No. 337,895, Apr. 14, 1989, Pat. No. 4,982,484, which is a continuation-in-part of Ser. No. 600,237, Apr. 16, 1984, abandoned, which is a division of Ser. No. 362,203, Mar. 26, 1982, Pat. No. 4,454,642. This application Oct. 9, 1990, Ser. No. 594,749

Int. Cl.[5] B23P *11/02*

U.S. Cl. 29—450 **8 Claims**



1. A method of positioning a retainer ring on an article, comprising:

(a) mounting a ring compressing assembly on a first slide,

(b) mounting a ring pusher member on a second slide for movement relative to said first slide,

(c) interconnecting the first slide and second slide with an actuator,

(d) moving the first slide and interconnected second slide in

unison thereby positioning the ring compressing assembly at a ring load position to receive an uncompressed ring,

(e) moving the first slide and second slide in unison thereby positioning the ring compressing assembly at an assembly position adjacent the article, and

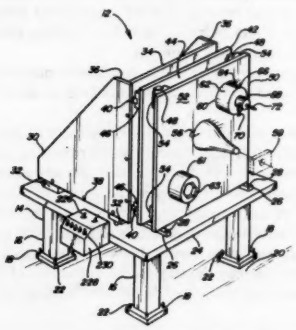
(f) moving the second slide relative to the first slide at the assembly position by actuating the actuator so that the ring pusher member pushes the uncompressed retainer ring along the ring compressing assembly thereby compressing to compress the retainer ring to assembly size and then to assemble the compressed ring onto the article.

5,072,506

POSITION SEEKING APPARATUS

Ernest A. Dacey, Jr., Highland, Mich., assignor to Utica Enterprises, Inc., Sterling Heights, Mich.

Filed Apr. 30, 1990, Ser. No. 516,554
Int. Cl.[5] B23P *19/00*
U.S. Cl. 29—464 **67 Claims**



1. An apparatus for locating and assuming a position with respect to an object that is located adjacent to said apparatus, said apparatus comprising:

a base structure having support means oriented in a generally horizontal attitude;

a transfer platform having structural members attached thereto, said transfer platform being positioned on said base structure in spaced apart relationship with respect to said support means;

means coupled between said transfer platform and said support means to cause relative motion therebetween in a first direction;

a resilient member secured to said support means;

immobilizing means secured to said transfer platform, said immobilizing means being engagable with said resilient member so as to immobilize the position of said transfer platform with respect to said support means;

a first slide assembly attached to and positioned in juxtaposed relationship with respect to one of said structural members of said transfer platform for movement in a second direction that is perpendicular to said first direction;

a second slide assembly attached to and positioned adjacent to said first slide assembly for movement in a third direction that is perpendicular to said first and second directions;

at least one probe attached to said second slide assembly for moving said second slide assembly and said first slide assembly to a first predetermined position, said first predetermined position being dictated by an externally positioned target; and

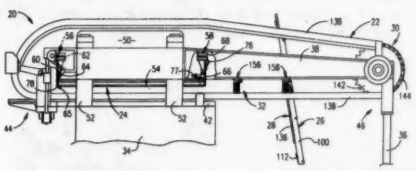
means coupled between said second slide assembly and said transfer platform for immobilizing the movement of said second and first slide assemblies with respect to said transfer platform.

5,072,507

DIE CHANGEOVER APPARATUS FOR BOX BLANK CUTTING MACHINE

William R. Meeks, Lawrence, Kans., assignor to The Lawrence Paper Company, Lawrence, Kans.

Filed Oct. 30, 1990, Ser. No. 605,741
Int. Cl.[5] B31B *1/14*; B23Q *3/155*
U.S. Cl. 29—568 **11 Claims**



1. A method of operating a blank cutting machine and changing die knife structure supported by a die frame in the blank cutting machine, said die frame being releasably secured to a reciprocal press member presenting a forward input end and an opposed, rearward output end, said method comprising the steps of:

positioning successive blanks within the machine in location for engagement by said die knife structure for die cutting of the blanks;

shifting die cut blanks toward and out of said rearward output end, and passing said die cut blanks between a pair of elongated, fore and aft extending frame arms respectively located on opposite sides of said press member and extending rearwardly from said output end;

changing said die knife structure from time to time as needed, including the steps of

stopping the blank cutting operation of said die cutting machine;

releasing said die frame from said press member;

shifting said released die frame rearwardly from said press member towards and out of said output end;

temporarily supporting said shifted die frame, and pivoting the die frame to an upright die changeover position;

removing the die knife structure supported by said die frame, and installing a different knife structure in said die frame;

pivoting said die frame back to a position permitting forward shifting thereof under said press member, and shifting the die frame forwardly into said output end and under the press member; and

securing said die frame to said press member.

5,072,508

METHOD OF MAKING AN INDUCTIVE-RESISTIVE CIRCUIT ELEMENT

Toshimi Kaneko, and Eiichi Maeda, both of Nagaokakyo, Japan, assignors to Murata Mfg. Co., Ltd., Japan

Division of Ser. No. 369,730, Jun. 22, 1989, abandoned. This application Feb. 28, 1991, Ser. No. 662,519
Claims priority, application Japan, Jun. 23, 1988, 63-83370
Int. Cl.[5] H01F *41/10*
U.S. Cl. 29—605 **9 Claims**

1. A method of making an inductive-resistive circuit element for noise-reduction, comprising the steps of:

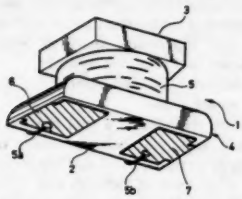
reducing the resistance of a core member made of a magnetic material by coating its surface with a reducing agent and

sintering said coated core member, so that a sintered core member having a resistance of substantially 0.5 to 5.0 kilohms is obtained;

winding a wire having two opposite ends around said sintered core member; and

electrically connecting a pair of electrodes to respective ends of said wire and to said core member, whereby said

core member provides an electrical resistance between said electrodes of substantially 0.5 to 5 kilohms, in parallel



with an inductance provided between said electrodes by said wire.

5,072,509

METHOD OF MANUFACTURING A BELT PULLEY

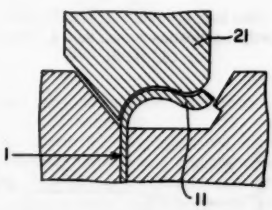
Joachim Bichel, Arnsberg, and Robert Temmann, Ascheberg, both of Fed. Rep. of Germany, assignors to Leifeld GmbH & Co., Ahlen/Westf, Fed. Rep. of Germany

Filed May 16, 1990, Ser. No. 524,159

Claims priority, application European Pat. Off., May 17, 1989, 89 108 837.9

Int. Cl.[5] B21K *1/42*

U.S. Cl. 29—892.3 2 Claims



2. Method of manufacturing from a metal disk a belt pulley having a hub and a circumferential area that is provided with a profile which is basically hollow cylindrical and the thickness of material of at least a major portion of the profile being greater than the thickness of the hub, comprising: in a single operational step giving the metal disk a wave-like profile in its circumferential area, and in another step rolling a finished profile in the wave-like profile produced in the first operational step.

5,072,510

ELECTRIC MOTOR LUBRICATION

Wayne J. Morrill, King & Hamsher Sts., Garrett, Ind. 45738 by Judith A. Morrill, Conservator

Division of Ser. No. 320,767, Mar. 8, 1989, Pat. No. 4,958,940, which is a continuation-in-part of Ser. No. 220,982, Jul. 15, 1988, abandoned, Continuation of Ser. No. 945,813, Dec. 24, 1986, abandoned. This application Jun. 28, 1990, Ser. No. 546,036

Int. Cl.[5] B21D *53/10*

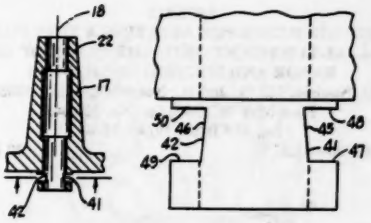
U.S. Cl. 29—898.1 8 Claims

1. A method of making a lubrication system for an electric motor having a rotor on a shaft journaled in an aperture in a bearing post for cooperation of the rotor with a stator, comprising the steps of:

cutting a groove in the bearing post with a machine tool from an outer surface of the post through to an intersection with said shaft aperture thereby forming an oil access hole;

said groove being near one end of said bearing post and having first and second side walls, with the first side wall being closest to said one end of the bearing post;

the groove being cut deeper at said second side wall than at said first side wall thereby forming a plow edge at the intersection of said groove and shaft aperture having an orientation that is at an acute angle with respect to the axis of the shaft aperture;



forming an oil reservoir for said bearing post; and

providing oil communication from said oil reservoir to said oil access hole.

5,072,511

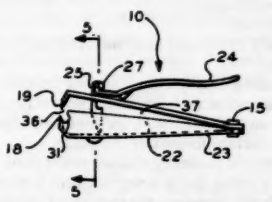
NAIL CLIPPER

Abraham E. Ro, 45 Deerfield Rd., Whippany, N.J. 07981

Continuation of Ser. No. 396,935, Aug. 22, 1989, abandoned. This application Oct. 5, 1990, Ser. No. 581,074

Int. Cl.[5] A45D *29/00*

U.S. Cl. 30—28 2 Claims



1. A nail clipper comprising:

a bottom container; a top resilient plate; connection means connecting adjacent ends of the container and the plate; said container having an upturned cutting edge at another end thereof; said plate having a downturned cutting edge disposed oppositely to the upturned cutting edge; a lever having a bent end portion with a shaft portion and having a heel portion; a post mounted on the container and having a post groove receiving the shaft portion, said post passing through a hole in the plate; said container having a near side wall and a far side wall and a bottom, together with the plate, forming a front chamber and a rear chamber; said front chamber having a front opening; and said plate having a top face with a door opening; said plate having a nail file connected at one end thereof to a rivet; said nail file having a bottom face in sliding engagement with the top face, the post has a necked down portion with grooves disposed between the plate and the bottom wall of the container thereby narrowing the post in a direction parallel to the downturned cutting edge, said necked-down portion grooves forming sides of respective passages disposed on either side of the post for ease of entry of a nail clipping to the rear chamber, said necked-down portion has a deflection surface substantially forming an elliptical cylinder section with an ellipse section surface running with a vertice of a major axis of the ellipse disposed on the post near the cylindrical groove and a substantially rectangular section adjoining the elliptical section, said rectangular section having two opposite sides defined by the necked down portion grooves of the post and said deflection surface facing said rear chamber, said deflection surface facing said rear chamber, said deflection surface being disposed at an angle to the bottom wall

of the container for downwardly deflecting a nail clipping into the rear chamber which is rebounding from the rear chamber.

5,072,512

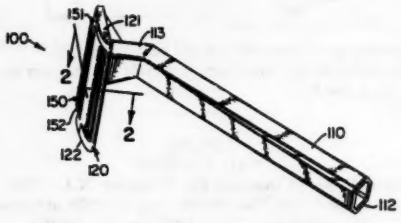
RESERVOIR RAZOR FOR APPLYING A THIN FILM OF METAL LUBRICANT ONTO THE BLADE OF THE RAZOR AND METHOD OF SHAVING

Elie G. Noujain, 912 W. 2nd St., Northfield, Minn. 55057

Filed May 18, 1990, Ser. No. 526,042

Int. Cl.[5] B26B *19/40, 19/48*

U.S. Cl. 30—41.5 **20 Claims**



1. A razor, comprising

(a) a head,

(b) a blade coupled to the head, the blade having a front sharpened edge,

(c) a reservoir,

(d) a supply of a metal lubricant retained within the reservoir, and

(e) a funneling channel, the funneling channel being in fluid communication with the reservoir, the funneling channel having an outlet sidewall, the funneling channel having a bottom surface formed by the blade;

(f) a plurality of funneling channel outlet ports, the funneling channel outlet ports being formed within and passing through the funneling channel outlet sidewall, the outlet ports above the blade having a perimeter, a portion of the perimeter being formed to hold the blade in position;

(g) a hinged pressure plate for dispensing the metal lubricant across the blade from the reservoir and through the funneling channel outlet ports, thereby reaching the front sharpened edge of the blade.

5,072,513

LOCK TYPE SWINGING APPARATUS IN A PAIR OF SWINGING MEMBERS AND FOLDING KNIFE PROVIDED WITH SAID APPARATUS

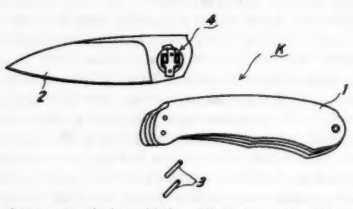
Kenichi Matsushima, 1084-18 Takaoka-cho, Hamamatsu-shi, Shizuoka-ken, 433, Japan

PCT No. PCT/JP89/00614, § 371 Date Feb. 19, 1991, § 102(e) Date Feb. 19, 1991, PCT Pub. No. WO90/15700, PCT Pub. Date Dec. 27, 1990

PCT Filed Jun. 20, 1989, Ser. No. 651,366

Int. Cl.[5] B26B *1/02*

U.S. Cl. 30—161 **8 Claims**



5. A folding knife in which a blade is swingably engaged with a holding handle through a swinging mechanism;

said swinging mechanism comprising a retaining member and two supporting members;

said retaining member being fixed to a body plate portion at a tip portion of said holding handle; said retaining member being provided at both sides thereof with said supporting members, said supporting members being reciprocally movable along said retaining member;

the outer periphery of said supporting members being formed in an arc shape;

said blade being provided at a root portion thereof with a circular hole, said blade being generally tightly engaged with the outer peripheries of said supporting members in said body plate portion through said circular hole; said blade being rotatable about said supporting members and said retaining member through said circular hole;

said blade being provided at suitable position of an inner peripheral edge of said circular hole with a retaining cut-out, said retaining member being able to be retained in said retaining cut-out by suitable means; and

said circular hole having two openings at both ends thereof, said two openings being covered with said body plate portion respectively. Accordingly, the following effects can be obtained.

5,072,514

ROUND SCRAPER TOOL

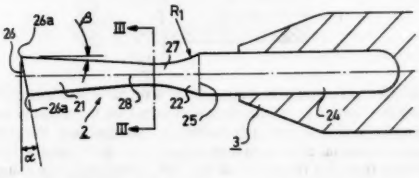
William Jubran, Kfar Meiliya, Israel, and Andre Carossino, Louveciennes, France, assignors to Vargus Ltd., Nahariya, Israel

Filed Sep. 4, 1990, Ser. No. 576,815

Claims priority, application Israel, Sep. 8, 1989, 91569

Int. Cl.[5] B26B *1/00*

U.S. Cl. 30—169 **17 Claims**



1. A scraper tool particularly useful for hand deburring internal rounded corners, holes and concave surfaces, comprising:

a scraper blade at the front end of the tool joined to a handle at the back end of the tool;

said scraper blade being integrally formed with a front part having a scraping edge, and a back part joined to a shank at the back end fixed to said handle;

the front face of the front part being of solid configuration and cut at an oblique angle to the plane passing perpendicularly to the scraper blade to define a solid planar oblong face having a continuous oblong scraping edge.

5,072,515

DEVICE FOR SLITTING AND CURLING ORNAMENTAL PACKAGING RIBBONS

Walter-Helmut Heitz, Hoher Holzweg 22, D-3005 Hemmingen 4, Fed. Rep. of Germany

Filed Dec. 28, 1989, Ser. No. 458,138

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1988, 8816240[U]

Int. Cl.[5] B26B *3/04*

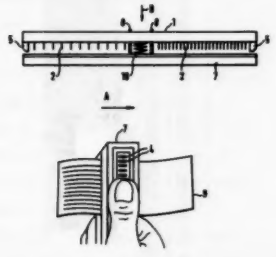
U.S. Cl. 30—304 **12 Claims**

1. A hand-held and operated device for slitting and curling ornamental packaging ribbon by pulling the ribbon through the device in a relative direction therebetween, said device comprising:

(a) a cutting punch having a plurality of cutting elements formed as fixed plastic blades each having a pair of oppositely-facing outer edges extending in the direction of said relative motion;

(b) a counterplate having a matrix with a plurality of holes each of which is associated with a corresponding plastic blade of said cutting punch, each plastic blade being insertable into the corresponding hole;

(c) means for elastically and movably connecting said cutting punch to said counterplate so that the side of said cutting punch having said plastic blades faces the side of said counterplate having said corresponding holes and so that said cutting punch and said counterplate are movable between an open position, in which the packaging ribbon may be inserted between said cutting punch and said counterplate, and a closed position in which said blades may pierce the packaging ribbon and penetrate the respective holes associated therewith, thereby permitting slitting



of the packaging ribbon upon relative movement between said device and the ribbon;

(d) said cutting punch having a first end, a second end, and a center located between said first and second ends, and said counterplate having a first end, a second end, and a center located between said first and second ends;

(e) said means for connecting said cutting punch and said counterplate with each other and for supporting them in their centers so as to form a bifurcated device and enabling them to be movable parallel with each other and, in their operating positions, to be disposed one above the other, so that all said plastic blades penetrate into said corresponding holes simultaneously; and

(f) wherein said means for connecting said cutting punch and said counterplate comprises a first guide pin separated from a second guide pin by a space therebetween, and a spring located in said space between said first guide pin and said second guide pin.

5,072,516

APPARATUS AND PROCESS FOR MAKING A SUPERCONDUCTING MAGNET FOR PARTICLE ACCELERATORS

Andrew J. Jarabak, Pittsburgh; Wallace H. Sunderman, McCandless Township, Allegheny County, and Edward G. Mendola, Fallowfield Township, Washington County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 360,192, Jun. 1, 1989. This application Oct. 30, 1990, Ser. No. 607,006

Int. Cl.[5] H01F *41/02*

U.S. Cl. 29—609 **6 Claims**

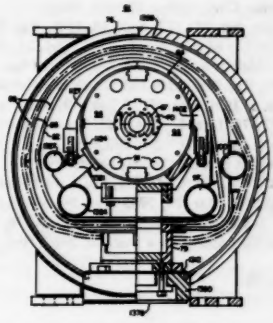
1. A method of assembling collar packs for a superconducting magnet, said method comprising the steps of:

providing a quantity of generally C-shaped laminations, each of said C-shaped laminations being of greater thickness in the middle portion than at the ends;

stacking a predetermined amount of said laminations to form a comb-shaped stack of laminations;

inserting a pin through said stack of laminations;

compressing said stack of laminations to a predetermined height; and



machining the pin at both ends so as to prevent the pin from being removed from said stack of laminations, whereby a collar pack is assembled.

5,072,517

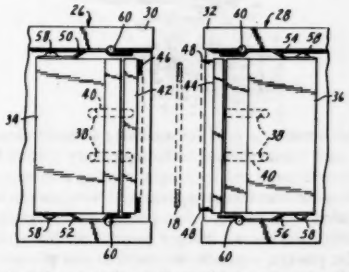
APPARATUS FOR RETAINING A TWO-PIECE CONNECTOR FOR ATTACHMENT TO A FLAT MULTICONDUCTOR ELECTRICAL CABLE

Raymond A. Hogenson, Austin, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 6, 1991, Ser. No. 711,194

Int. Cl.[5] H01R *43/04*

U.S. Cl. 29—749 **10 Claims**



1. Tooling for receiving and attaching a two-part electrical connector to a flat, multiconductor cable, including:

two opposed bases one on each side of the cable, with at least one of said bases being movable toward the other of said bases and said cable to contact and grip the cable between said bases;

two strikers supported one on each of said bases and movable relative to said bases toward each other and the cable, said strikers being movable between a retracted position wherein one part of the two-part electrical connector may be located on each of said bases between said strikers and the cable and an extended position wherein said strikers force the connector parts against the cable;

gripper means attached to each of said strikers for gripping the connector parts prior to attachment of the connector parts to the cable, said gripper means being free of contact with the connector parts when said strikers are in said retracted position; and

camming means on said bases for contacting said gripper means as said strikers move from said retracted position toward said extended positions and for forcing said gripper means into contact with the connector parts.

5,072,518

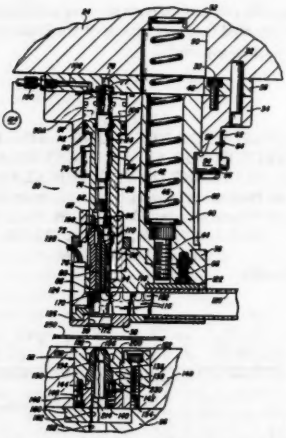
INSTALLATION HEAD FOR ATTACHING FEMALE FASTENERS

Raymond E. Scott, Frankfurt, Fed. Rep. of Germany, assignor to Multifastener Corporation, Detroit, Mich.

Division of Ser. No. 271,123, Nov. 14, 1988, Pat. No. 4,893,394, which is a division of Ser. No. 111,966, Oct. 21, 1987, Pat. No. 4,831,698, which is a continuation-in-part of Ser. No. 69,804, Aug. 17, 1987, Pat. No. 4,810,143, which is a division of Ser. No. 869,507, Jun. 2, 1986, Pat. No. 4,700,470, which is a division of Ser. No. 657,570, Oct. 4, 1984, Pat. No. 4,610,072, which is a continuation-in-part of Ser. No. 563,833, Dec. 21, 1983, Pat. No. 4,555,838, which is a continuation-in-part of Ser. No. 504,074, Jun. 14, 1983, Pat. No. 4,543,701, and a continuation-in-part of Ser. No. 485,099, Mar. 28, 1983, Pat. No. 4,459,073, said Ser. No. 504,074, is a continuation of Ser. No. 229,274, Jan. 28, 1981, abandoned. This application Dec. 26, 1989, Ser. No. 457,060

Int. Cl.[5] B21D *39/00*

U.S. Cl. 29—798 11 Claims



1. An installation head for attaching a female element to a panel, said female element including a body portion having a bore therethrough and an integral riveting portion having an open free end communicating with said body portion bore, said installation head having a first passage receiving said female elements and a second plunger passage communicating with said flat passage, a punch reciprocal in said plunger passage including a body portion having an outer surface and a free end, said punch free end including an integral generally cylindrical axially extending piercing portion and a transitional generally arcuate drawing surface extending generally radially outwardly from said piercing portion and blending into said body portion outer surface, and a plunger telescopically disposed around said punch outer surface having a driving surface at its free end, said punch free end telescopically receivable through said female element bore and riveting portion to engage a panel located opposite said riveting portion free end, and said installation head including an actuating means for driving said punch piercing portion into piercing engagement with said panel, whereby when said punch piercing portion is driven into piercing engagement with said panel, a slug is pierced from said panel forming a pierced panel opening, whereby said actuating means is adapted for driving said drawing surface against said panel adjacent said pierced panel opening thereby enlarging said panel opening and driving said drawing surface through said panel opening, and said actuating means further adapted for driving said plunger driving surface against said female element body portion thereby driving said riveting portion through said enlarged panel opening.

5,072,519

METHOD OF PRODUCING ELECTRIC CIRCUIT PATTERNS

Akira Mase, Atsugi, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

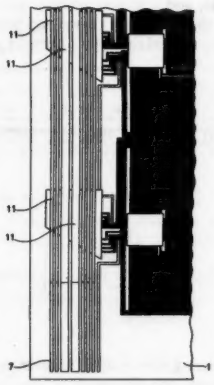
Division of Ser. No. 303,241, Jan. 30, 1989, Pat. No. 4,934,045. This application Mar. 19, 1990, Ser. No. 495,758

Claims priority, application Japan, Feb. 3, 1988, 63-25914; Feb. 5, 1988, 63-25912; Feb. 5, 1988, 63-25913; Feb. 5, 1988, 63-25911; Feb. 5, 1988, 63-25915; Feb. 5, 1988, 63-25916

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.[5] A05K *3/34*

U.S. Cl. 29—840 4 Claims



1. A method of producing electric circuit patterns consisting of a plurality of buslines and two or more sets of lead lines, the lead lines of each set being coupled to said buslines respectively, said method comprising;

forming two or more preceding patterns, each consisting of the lead lines of one of said sets and fragments of said buslines which have been already coupled, wherein the fragments belonging to each preceding pattern are spaced from those of the adjacent preceding patterns;

coating an insulating film over portions of said preceding patterns of said sets that are located at sites on which said buslines are to be formed;

electrically coupling the fragmented buslines of adjacent preceding patterns by coating compensatory buslines in alignment with the fragmented buslines over said insulating films; and

connecting an electric device to each set of lead lines by face down bonding.

5,072,520

METHOD OF MANUFACTURING AN INTERCONNECT DEVICE HAVING COPLANAR CONTACT BUMPS

Gregory H. Nelson, Gilbert, Ariz., assignor to Rogers Corporation, Rogers, Conn.

Filed Oct. 23, 1990, Ser. No. 601,904

Int. Cl.[5] H01K *3/10*

U.S. Cl. 29—852 8 Claims

1. A method for forming an electrical interconnect device having contact bumps, including the steps of:

establishing a mold in which a plurality of flat topped contact bumps are to be formed, said mold including a relatively thin and flat layer of first material and a relatively thick layer of a second material, said second layer being selectively removable;

defining sites in said second material at which the contact bumps are to be formed;

selectively removing said second material at each of said

sites to expose a flat area of said first material at each site to form a hole of predetermined size and shape in said second material intersecting said first material at said flat area;

forming an electrically conductive contact element in each of said holes conforming to the shape of said hole; each of said electrically conductive contact elements having a flat surface coplanar with the flat surface of each of the other of said conductive elements;

A FORM RELEASE MOLD LAYER ON BACKER PLATE
B PATTERN BUMP SITES
C ETCH BUMP MOLD HOLES
D PLATE BUMP CONTACT LAYER
E PLATE BARRIER LAYER
F PLATE AND OVERFILL BUMP VOLUME
G REMOVE RESIST
H PLANARIZE
I PATTERN LEAD LINES
J PLATE LEAD LINES
K POSITION ADHESIVE FILM
L POSITION AND BOND DIELECTRIC
M REMOVE CARRIER LAYER
N ETCH MOLD LAYER
O SINGULATE
P PLACE AND BOND LAMINATE
Q FORM VIA HOLES
R FORM VIA AND VOLTAGE PLANE
S FORM BOUNDARY
T PLATE PROTECTIVE LAYER

forming a plurality of electrical circuit lines on said second material, each of said circuit lines including at least one of said contact elements;

bonding said circuit lines together with electrically insulating material; and

removing said contact elements from said mold to define an interconnect device having a plurality of circuit lines with at least one contact bump in each circuit line, the contact bumps all being coplanar.

5,072,521

METHOD OF MAKING ELECTRICAL CONTACT

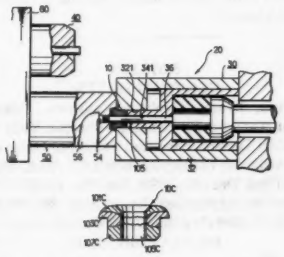
Noboru Sasaki, and Masayuki Ueyama, both of Tsuruoka, Japan, assignors to Tanaka Kikinzoku Kogyo K.K., Tokyo, Japan

Division of Ser. No. 161,237, Feb. 18, 1988, which is a continuation of Ser. No. 926,052, Nov. 3, 1986, abandoned. This application Mar. 27, 1991, Ser. No. 675,849

Claims priority, application Japan, Dec. 17, 1985, 60-284086; Dec. 25, 1985, 60-295155

Int. Cl.[5] H01R *43/02*

U.S. Cl. 29—879 **3 Claims**



1. A method of making an electrical contact, which comprises steps of transfering materials which consists of a contact stock and a base stock to a position at front of a die pin of an inner die in a composite die; forwarding a first punch to insert the materials in a die bore of the composite die and press down the same to form a central blind hole at a side of the contact stock and simultaneously retracting the inner die to form another central blind hole at a side of the base stock; pressing and deforming the resulting material block by a second punch to dress one side thereof; and forwarding the die pin into the central blind hole to finally form a through opening.

5,072,522

COUNTERBALANCE CONTROL APPARATUS

Christopher Stott, Chellaston, and Howard T. Salt, Hatton, both of United Kingdom, assignors to LK Limited, Derby, United Kingdom

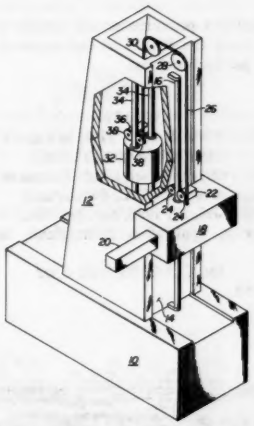
PCT No. PCT/GB89/00348, § 371 Date Nov. 13, 1990, § 102(e) Date Nov. 13, 1990, PCT Pub. No. WO89/09921, PCT Pub. Date Oct. 19, 1989

PCT Filed Apr. 5, 1989, Ser. No. 576,512

Claims priority, application United Kingdom, Apr. 8, 1988, 8808283

Int. Cl.[5] G01B *5/02*

U.S. Cl. 33—503 **10 Claims**



1. A control apparatus for a carriage, comprising:

a base (**10**);

a carriage (**18**) movably supported by said base (**10**) for movement in a vertical direction;

a counterbalance member (**32**) movably supported by said base (**10**) for movement in a vertical direction;

first motor means (**22**) affixed with the carriage (**18**) for moving the carriage (**18**) along a first bar (**16**) on the base (**10**);

means (**20**) for interconnecting the carriage (**18**) with the counterbalance member (**32**); and

second motor means (**36**) affixed with the counterbalance member (**32**) for moving the counterbalance member (**32**) along a second bar (**34**), in a direction opposed to that of the carriage (**32**), wherein respective motive forces applied to said first and second motor means (**22,36**) are substantially equal.

5,072,523

ELECTRICAL BOX MOUNTING TOOL

M. Dickson Bennett, Wilton, Conn., assignor to Dickson Product Development, Inc., Norwalk, Conn.

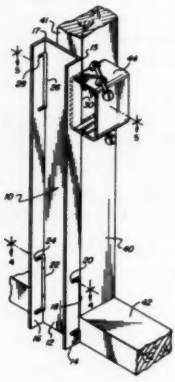
Filed Dec. 24, 1990, Ser. No. 633,322

Int. Cl.[5] B25B *11/00;* **B23Q** *3/00*

U.S. Cl. 33—528 **17 Claims**

1. An electrical box mounting tool comprising:

a channel member having a back wall and a sidewall connected at a corner; and



a longitudinal slot provided at said corner at a measured distance along the length of said channel member for receiving an electrical box.

5,072,524

ELECTRONIC SENSOR FOR THE MEASUREMENT OF LINEAR MAGNITUDES

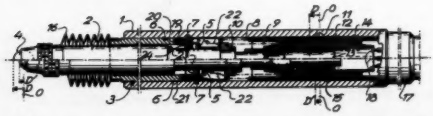
Adriano Zanier, Prilly, and Jürg Lendi, Lausanne, both of Switzerland, assignors to Tesa S.A., Switzerland

Filed Jul. 17, 1990, Ser. No. 554,134

Claims priority, application Switzerland, Sep. 1, 1989, 3176/89

Int. Cl.[5] G01B *7/02, 5/02*

U.S. Cl. 33—558 **5 Claims**



1. An electronic measurement sensor for linear magnitudes, comprising a body intended to be fastened in a measurement support, a measurement rod movable axially within the body in the direction of the measurement over a distance limited by an adjustable system of end-of-stroke stops, comprising a resting piece integral with the rod, an end-of-stroke stop associated with the body and-intended to limit the measurement stroke, and a spring between the rod and the body to produce a measurement pressure, a measurement feeler fastened on the tip of the rod on the outside of the body, an electronic transducer within the body sensitive to axial displacements of the rod and adapted to produce an electric signal representative of the algebraic magnitude of said displacements with respect to a preadjusted electric zero, and means for adjusting the positioning of the measurement feeler with respect to the electric zero, characterized by the fact that the body (**1, 25**) and the measurement rod (**2, 26**) comprise local interpenetration means (**19-20-21, 28-33-34**) having at least one resting stage of predetermined height in the direction of displacement of the rod, which means are located between the resting piece (**5, 28**) of the rod and the stop associated with the body, and a spring (**8, 30**) to keep said means resting against same, the interpenetration in the resting stage being located by manual push in opposition to the spring and rotation of the rod around its longitudinal axis, and then obtained and assured by release, in the manner of so-called "bayonet" connections.

5,072,525

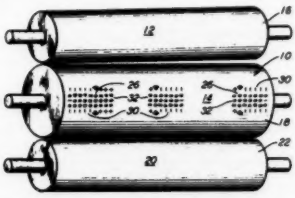
PRINT ANALYSIS SYSTEM

Ivan N. Philpot, and Bruce G. Bittick, both of Irving, Tex., assignors to Matthews International Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1990, Ser. No. 606,232

Int. Cl.[5] B41B *1/00*

U.S. Cl. 33—618 **53 Claims**



1. A gauging instrument for providing an accurate alignment in a printing arrangement between adjacent working surfaces of an anilox roll and a printing plate cylinder and between adjacent working surfaces of such printing plate cylinder and an impression cylinder so that substantial parallelism can be established between such adjacent working surfaces of such anilox roll and such printing plate cylinder and such adjacent working surfaces of such printing plate cylinder and such impression cylinder in each print station disposed in such printing arrangement, said gauging instrument comprising:

(a) at least one generally flexible member having a predetermined length, a predetermined width and a first predetermined thickness, a back surface of said flexible member being engageable with at least a portion of an outer working surface of such printing plate cylinder;

(b) at least two first sets of indicia, disposed at predetermined locations on an upper surface of said flexible member, representing a zero point of a gap established between such impression cylinder and such printing plate cylinder, said first sets of indicia having a second predetermined thickness;

(c) at least two second sets of indicia, disposed at predetermined locations of said upper surface of said flexible member, said second sets of indicia representing a positive distance such gap established between such impression cylinder and such printing plate cylinder is from said zero point, said second sets of indicia having a third predetermined thickness; and

(d) at least two third sets of indicia, disposed at predetermined locations on said upper surface of said flexible member, said third sets of indicia representing a negative distance such gap established between such impression cylinder and such printing plate cylinder is from said zero point, said third sets of indicia having a fourth predetermined thickness.

5,072,526

CLOTHES DRYER

Tatsuya Hirota, Kyoto; Kiyokazu Fujikawa, Shiga; Yoshiaki Aoki, Otsu; Tamotsu Kawamura, Yokaichi; Yozo Kawamura, Otsu; Kouichi Tanaka, Otsu, and Takafumi Hamano, Otsu, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 18, 1989, Ser. No. 452,593

Claims priority, application Japan, May 26, 1989, 1-134054; May 31, 1989, 1-138615; Jun. 19, 1989, 1-156242

Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—60 **8 Claims**

1. A clothes dryer comprising:

a body having a drying chamber for accommodating the clothes to be dried;

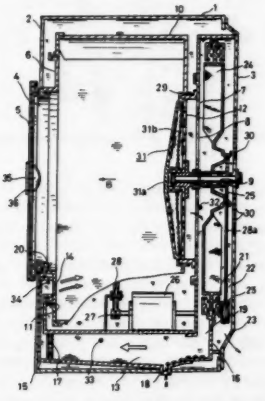
drying means for supplying heated air to said drying chamber to dry the clothes placed in said drying chamber;

a door attached to said body for closing and opening said drying chamber;

a container for holding an agent which can be vaporized by the heated air;

a hollow supporting member integral with said door for detachably supporting the container therein, said supporting member having an opening at an end thereof;

said supporting member having in its interior means for detachably holding said container including an engaging member, a pushing member resiliently urged toward said



hollow supporting member opening and a holding member at the opening for limiting outward travel of the pushing member said container being detachable by releasing the engaging member from the force of said pushing member,

at least one of said container and supporting member having an aperture through which part of the heated air supplied to said drying chamber flows to vaporize the agent in said container and for supplying the vaporized agent into said drying chamber.

5,072,527

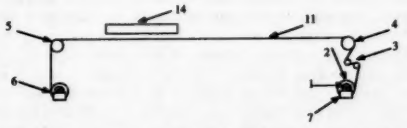
METHOD AND APPARATUS FOR CONVEYING AND TENSIONING A LENGTH OF SHEET MATERIAL

Leo S. Loomie, 9 Hall Pl., Albany, N.Y. 12210

Filed Jun. 6, 1990, Ser. No. 534,112

Int. Cl.[5] F26B *13/00*

U.S. Cl. 34—153 **1 Claim**



1. An apparatus for suspending and conveying, with adjustable tension and adjustable speed, a length of textile fabric above a work surface comprising:

a feed means comprising a free turning feed roller removably seated in notch bearings at either end attached to

a tensioning means comprising a plurality of friction bars attached to

a drying means attached to

a drive assembly comprising a drive roller upon which said length of textile fabric is wound, conveyor drive motor and controls;

said drive roller having two ends, the first end seated removably in a notch bearing, the second end attached to a universal joint which allows said drive roller to pivot freely about said universal joint,

said drive roller comprising a drive knife attached approximately centrally, and comprising a tube of sufficiently greater diameter than said drive roller to allow said tube to be slideably removably attached to said drive roller,

said drive knife comprising a hinge pin and an upper and lower extending planar member pivotably attached thereto, the lower planar member attached to said drive roller, the upper planar member having the upper edge sharpened and serrated, and said drive knife further comprising

a leaf spring which is comprised of a curved length of spring steel in the form of a shallow arc, the leaf spring having an upper and lower end, said leaf spring positioned below said upper planar member of said drive knife so that the lower end of said leaf spring is attached to said drive roller, and the upper end of said leaf spring is held in contact with said upper planar member of said drive knife so that said upper planar member is in pressurable contact with said tube,

said conveyor drive motor comprising a gearmotor attached to said drive motor controls, said drive motor controls comprising an electronic speed controller attached to a power switch and means to connect to a power supply.

5,072,528

LASTING INSOLE

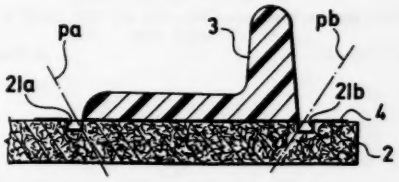
Josef Habrovansk; Vincenc Boltnar; Jirí Rybka; Albín Korvas, and Jindrich Svajda, all of Gottwaldov, Czechoslovakia, assignors to Obuvnicky Prumsyl Svit, Czechoslovakia

Filed Mar. 19, 1990, Ser. No. 496,434

Claims priority, application Czechoslovakia, Mar. 17, 1989, 1658-89; Mar. 17, 1989, 1662-89

Int. Cl.[5] A43B *13/38*

U.S. Cl. 36—43 **10 Claims**



1. A lasting insole for a welted shoe, said lasting insole comprising:

a permeable support layer which includes a surface, said surface having spaced apart grooves extending around its periphery;

a rib for connecting an upper and a welt to said support layer, said rib being located between said grooves and extending around the periphery of the surface of the support layer; and

connecting means for connecting said rib to said surface of said support layer.

5,072,529

ICE SKATE

Karl Graf, Kreuzlingen, Switzerland, assignor to Graf & Co. Sportschuhfabrik Kreuzlingen, Kreuzlingen, Switzerland

Continuation of Ser. No. 312,896, Feb. 17, 1989, abandoned. This application Dec. 7, 1990, Ser. No. 624,511

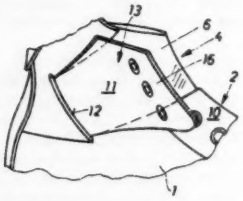
Claims priority, application Switzerland, Feb. 19, 1988, 617/88

Int. Cl.[5] A43B *5/16, 7/20*

U.S. Cl. 36—115 **1 Claim**

1. An ice skate comprising a skate leg (1) having a recess

filled by an ankle pad (6), the ankle pad (6) comprising at least four edges and being sewn along three of its edges to the skate leg (1), a leg flap (11) that is pivotably connected to the skate leg (1) along a first edge (12) of the leg flap (11), whereby the leg flap (11) may be pivoted towards the ankle pad (6) to a first position in which the leg flap (11) covers the ankle pad (6) and away from the ankle pad (6) to a second position in which the



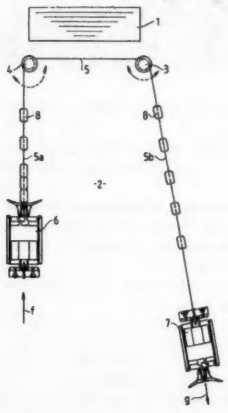
leg flap (11) does not cover the ankle pad (6), the leg flap (11) further including a lacing region (13) comprising a first set of eyelets (14), the ice skate leg further comprising a second set of eyelets (3) positioned below the leg flap (11), whereby the first set of eyelets (14) and the second set of eyelets (3) lie in a common line (15) when the leg flap (11) is pivoted to the first position in which the leg flap (11) covers the ankle pad (6).

5,072,530

DEVICE FOR PREPARING THE LANDING PISTE OF A SKI-JUMP

Walter Goller, Ortisei, Italy, assignor to Prinoth S.p.A., Ortisei, Italy

Filed Mar. 19, 1990, Ser. No. 495,851
Claims priority, application Italy, Oct. 17, 1989, 22047 A/89
Int. Cl.[5] E01H *4/00*
U.S. Cl. 37—219 **10 Claims**



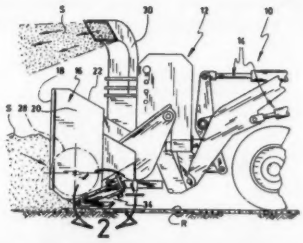
1. A device for preparing a landing piste of a ski-jump, wherein guide and deflection rollers (3, 4) are provided which are arranged with clearance in the vicinity of a take-off platform (1) of the ski-jump and receive a cable (5), and wherein end portions (*5a, 5b*) of the cable are arranged along the landing piste (2) and are connectable to at least two snow grooming vehicles (6, 7) which are movable in opposite directions.

5,072,531

GROUND SHOE FOR SNOW BLOWING VEHICLE

Normand Pronovost, and Réjean Pronovost, both of 260, Route 159, St-Tite, Québec, Canada G0X 3H0

Filed Dec. 11, 1990, Ser. No. 625,758
Int. Cl.[5] E01H *5/07*
U.S. Cl. 37—256 **3 Claims**



1. In combination, an automotive snowplow vehicle having a front, snow-collecting bucket destined to collect snow and ice upon forward motion of the vehicle on a road pavement, said vehicle destined to have additional means for further crushing snow and ice within said bucket, for gathering the crushed snow and ice and for ejecting same laterally away from the road through a pivotable chute; said bucket defining a large, frontwardly-opened casing having top, bottom, rear and substantially vertical side walls bounding a large, front mouth, and a pair of skate mount assemblies each mounted to a bottom, rear end section of a corresponding one of the two said side walls of the bucket casing; each said skate mount assembly defining a substantially straight skate member integrally mounted to said bucket and defining a smooth, substantially horizontal underface designed to slidingly horizontally engage said road, the front, leading edge section of said skate member being upwardly forwardly inclined, said bucket bottom wall or floor defining a front leading edge being slightly rearwardly offset relative to the level of said skate member upturned front edge section; each said skate mount assembly being positioned substantially interiorly of the vertical plane passing through the corresponding bucket side wall; further including adjustment means for concurrently adjusting both the elevation of said skate member relative to said bucket flooring and the fore-and-aft position of said skate member relative to said bucket flooring front leading edge, wherein forward displacement of the skate member position is effected concurrently with downward displacement thereof, or rearward displacement of the skate member position is effected concurrently with upward displacement thereof; wherein each said skate mount assembly further includes a frame member, integrally mounted to said corresponding bucket side wall, said frame member defining an open-ended rearwardly, upwardly-inclined channel extending therethrough, an elongated slider shaft slidably engaged into said channel and endwisely integrally carrying said skate member at its bottom end at an acute angle, and locking means to fixedly releasably secure said slider shaft to said frame member in a selected lengthwise position within said channel; and wherein said channel and said slider shaft are cross-sectionally polygonal, said skate mount assembly further defining a free rearward section, clearing said bucket, and wherein said locking means includes:

a) a number of first teeth, upwardly projecting from the rearward section of said slider shaft;

b) a lever arm, pivotally mounted at its top end by a pivot ear to said skate mount frame, said pivot ear defining a pivotal axis extending parallel to said channel and a number of few second teeth downwardly depending therefrom, wherein said lever arm is pivotable between a first operative position, in which said first teeth matingly engage into the troughs between said second teeth, thereby positively preventing sliding motion of said shaft within said channel and thus anchoring thereof therewithin, and a second

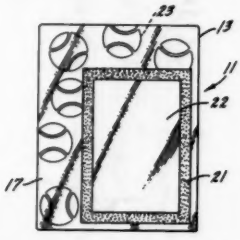
inoperative position, in which said first and second teeth are clearly spaced from each other, thereby enabling free sliding motion of said shaft through said channel.

5,072,532

DECORATIVE PICTURE FRAME

Julia F. Kelly, 179 E. Lake Shore Dr., Chicago, Ill. 60611

Filed Nov. 3, 1988, Ser. No. 266,585
Int. Cl.[5] G09F 1/12
U.S. Cl. 40—152.1 4 Claims



1. A decorative frame for a picture, including:
a flat piece of plate glass of generally uniform thickness having a front face and a rear face,
a translucent band etched on the front face of the glass to define a picture viewing area,
an ornamental design etched on the rear face of the glass outwardly of the translucent band, and
support means adhered to the rear face of the glass behind the translucent band so as not to be visible from the front face of the piece of glass,
said support means adapted to receive a picture backing board and a backing board support leg to hold the picture against the rear face of the glass and within the viewing area defined by the translucent band.

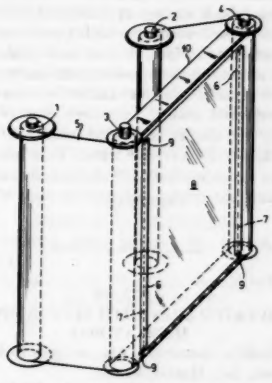
5,072,533

SYSTEM FOR ROLLING ADVERTISING POSTERS

Heinz Doepgen, Gosperstrasse 18-20, B-4700 Eupen, Belgium; Gerhard Winkelmann, Brahmsweg 1, D-5014 Kerpen, Fed. Rep. of Germany, and Jean Vermeulen, De Roest d'Alkemadelaan 5-59, B-2600 Berchem, Belgium

PCT No. PCT/BE88/00028, § 371 Date Jun. 7, 1989, § 102(e) Date Jun. 7, 1989, PCT Pub. No. WO89/03570, PCT Pub. Date Apr. 20, 1989
PCT Filed Oct. 7, 1988, Ser. No. 381,657
Claims priority, application Belgium, Oct. 7, 1987, 8701141; Dec. 21, 1987, 8701464
Int. Cl.[5] G09F 11/18
U.S. Cl. 40—518 5 Claims

1. A support assembly for displaying advertising posters, said assembly comprising:
a first reel and a second reel rotatable about respective unwinding axes and defining a transport path therebetween;
a transport band of polyethylene glycol terephthalate mounted rotatably on said first and second reels and bridging said reels, so that said transport band is rolled upon said reels and displaced along said path;
a first roller and a second roller rotatable about respective vertical return axes parallel to one another and spaced from one another along said transport path;
a flat planar endless support band spanned between said rollers for supporting said transport band, said transport band passing around said rollers and being in contact with said endless band located adjacent to said transport band between said rollers, so that said endless band is driven upon rolling of said transport band; and
means on said transport band for yieldably mounting a poster on said transport band, said endless band lying against said transport band, so that said transport band



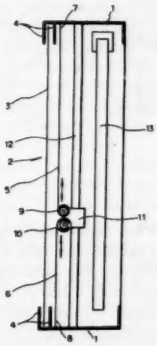
with said poster mounted thereon is supported by said endless band between said first and second rollers.

5,072,534

DISPLAY SIGN HAVING COACTING DISPLAY ROLLERS AND DRIVE BELT ATTACHMENT

John Kodet, 139 Queens Rd., Connells Point, New South Wales 2221, Australia

Filed Mar. 26, 1990, Ser. No. 498,701
Int. Cl.[5] G09F 11/12
U.S. Cl. 40—524 1 Claim



1. A sign comprising:
a display face;
a pair of display belts which carry display material;
a rail member extending from one side of the display face to the other;
a carriage which travels along said rail member, said carriage having a front and a back, said back of said carriage having two parallel bars;
a disk;
a lug having fingers, said lug mounted on said disk, said disk being constrained to slide between said two parallel bars on the back of said carriage, said parallel bars arranged perpendicular to the direction of movement of said carriage along said rail member;
a drive mechanism for said carriage comprising an endless belt which runs between a pair of pulleys, located at opposite ends of said rail member, said endless belt engaging said lug by passing between said fingers on said lug so

that rotation of said endless belt propels said carriage across said display sign while allowing said lug to move vertically between said parallel bars when lug passes around each of said pulleys; and

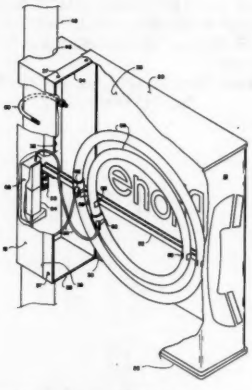
two rollers which during operation of the sign remain mounted on said carriage which travels back and forth across said display face, each of said display belts being secured at one end to respective fixed anchorages at opposite sides of said display face and at the other end, connect with and wind around respective ones of said rollers, whereby said display belts wind onto or off their respective rollers as the carriage travels back and forth across said face to continuously and sequentially exhibit for view or conceal the display material on each of said display belts.

5,072,535

ILLUMINATED SIGN WITH SELF-SUPPORTING DISPLAY BOX

Sandra D. Jenkins, Somerville, Ala., assignor to Southern Communications, Inc., Huntsville, Ala.

Filed May 29, 1990, Ser. No. 529,504
Int. Cl.[5] G09F *13/04*
U.S. Cl. 40—564 **1 Claim**



1. An illuminated box sign comprising:

a rigid, generally rectangular trough support member having a base portion and four sides integral therewith, edges of said sides providing a receptacle of rectangular cross section, said support member being made of a plastic resin formed by casting and including a layer of fiberglass-containing resin;

a rectangular plastic display box in the form of an integral five-sided unit defining front and back direct viewing faces, top and bottom faces between the front and back faces, an end face and an open end adapted to fit onto the receptacle of the support member in overlapping relation therewith, said top and bottom faces extending outwardly slightly from their juncture with the front, back, and rear faces, providing top and bottom ledges;

at least one electric lamp disposed in said display box and secured to said support member;

electric lamp activating means secured to said support member;

means securing said display box to said support member at their overlapped region; and

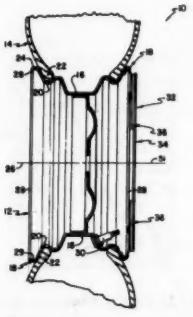
a U-shaped sleeve adapted to fit over said front, back, and end faces, with edges of said sleeve in contact with said ledges.

5,072,536

TECHNIQUE FOR DISPLAYING CUSTOM VEHICULAR WHEELS

Max M. Matthews, 500 El Rancho #11, McAllen, Tex. 78501, and Scott E. Matthews, 6713 N. 14th La., McAllen, Tex. 78504

Filed Mar. 9, 1990, Ser. No. 490,927
Int. Cl.[5] G09F *21/04*
U.S. Cl. 40—587 **13 Claims**



1. In combination,

a vehicle having a set of wheel-tire assemblies including wheels having an axis of rotation and an annular lip section of a first diameter defining a first plane;

a connector on a first of the assemblies comprising a series of clips extending into engagement with the lip and an annular ring having an outer diameter smaller than the first diameter and attached to the clips and positioned in a plane parallel to the first plane, the clips including a resilient section, a rigid section and means mounting the rigid section on the ring for adjustable radial movement;

a generally circular representation of a custom wheel different than the first wheel having a simulated axis of rotation and an outer diameter substantially the same as the first diameter, the representation being a full size axial representation of the custom wheel viewed perpendicularly to the simulated axis of rotation of the custom wheel and being attached to the connector in a position where the axis of rotation and the simulated axis of rotation substantially coincide thereby substantially covering the wheel of the first assembly; and

means connecting the representation to the annular ring.

5,072,537

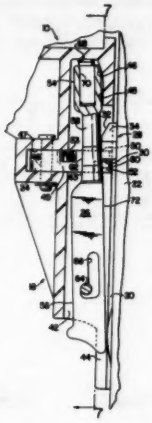
MAGAZINE CATCH ASSEMBLY

George A. Velezis, 175 Skyline Dr., Middlebury, Conn. 06762

Filed Dec. 7, 1990, Ser. No. 624,414
Int. Cl.[5] F41A *9/25*
U.S. Cl. 42—18 **18 Claims**

1. A firearm having magazine housing means defining a magazine well for receiving a magazine therein, and a catch assembly supported on the firearm for releasably retaining a magazine in the magazine well and including at least one magazine catch supported for movement between magazine retaining and magazine releasing positions, said magazine catch in its magazine retaining position being engagable with an associated part of a magazine such as aforesaid disposed within the magazine well to secure the magazine in the well, said magazine catch in its magazine releasing position being out of engagement with the part, and a manually operable actuating member for moving said magazine catch to its magazine releasing position, said actuating member being supported for movement between a first position corresponding to said magazine retaining position and a second position corresponding to said magazine releasing position, and latching means for releasably se-

curing said actuating member in a latching position wherein said magazine catch is in said magazine releasing position in



response to movement of the actuating member to said second position.

5,072,538

SKIMMER WITH PIVOTED STRAINER PORTIONS

William G. Hendricks, Nashwauk, and Richard A. Eimer, Duluth, both of Minn., assignors to Tackle Tamer Products, Inc., Keewatin, Minn.

Filed Dec. 3, 1990, Ser. No. 620,569
Int. Cl.[5] A01K *79/00*
U.S. Cl. 43—4 20 Claims

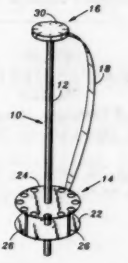
1. A device for removing debris suspended in fluid within a clogged bore, said device comprising an elongate handle member having a distal portion and a strainer assembly attached to said distal portion, said strainer assembly including more than one strainer basket portion and a hinge assembly, said hinge assembly including a body portion having an axial bore axially aligned with and sized to receive said distal portion of said handle member and a hinge portion for attaching each respective strainer basket portion of said more than one strainer basket portion to said handle member, each hinge portion permitting pivoting of each respective strainer basket portion between a closed position wherein the strainer basket portions are disposed proximate the handle member and an open position in which the strainer basket portions form a strainer basket extending circumferential and generally perpendicular to a longitudinal axis of the handle member, each said strainer basket portion including means for stopping the respective strainer basket portion in the open position, the strainer basket formed by the strainer basket portions including a plurality of apertures therethrough opening generally in a direction parallel to the longitudinal axis of said handle member, whereby said strainer assembly may be inserted into the clogged bore with each strainer basket portion in the closed position and withdrawn from the clogged bore subsequent to each strainer basket portion being pivoted to form the strainer basket to thereby catch and remove debris from the clogged bore.

5,072,539

FISHING POLE HOLDER

Philip J. Greenberg, 20622 Superior St., Unit 6, Chatsworth, Calif. 91311

Filed Jan. 23, 1991, Ser. No. 644,943
Int. Cl.[5] A01K *97/10*
U.S. Cl. 43—21.2 16 Claims



1. A fishing pole apparatus comprising:

a generally elongate central support member;

first and second discs secured at the centers thereof to said support member in spaced relation to one another adjacent one end of said support member, the first disc being furthest from said one end and having a plurality of circumferentially arranged openings dimensioned for receiving the handles of the fishing poles therethrough in abutting relation to the second disc;

a rod retaining assembly centrally disposed on and affixed adjacent the other end of said support member, said assembly including a disc member with the outer perimeter thereof having scalloped cutouts equal in number to the number of handle receiving openings in said first disc, and frictional means adjacent said disc member configured for frictionally retaining the shafts of the fishing poles therein in general alignment with the openings of said first disc and said support member; and

support means on said one end of said support member for supporting said apparatus on a surface.

5,072,540

DEVICE FOR MEASURING SUBSURFACE TEMPERATURES OF LIQUID BODIES, USEFUL FOR DETERMINING OPTIMUM FISHING LOCATIONS

Bruce F. Monzyk, 2254 Murray Forest, Maryland Heights, Md. 63043, and Lloyd A. Woodard, 7322 E. 107th St., Kansas City, Mo. 64134

Division of Ser. No. 46,782, May 7, 1987, Pat. No. 4,883,365.
This application Nov. 17, 1989, Ser. No. 438,627
Int. Cl.[5] A01K *85/00*
U.S. Cl. 43—4 3 Claims

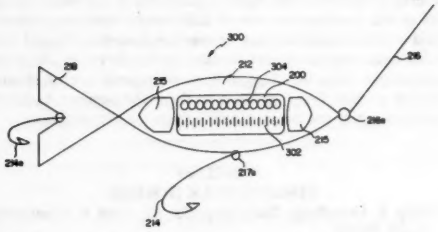
1. A fishing lure comprising:

a body portion formed in a contour to simulate bait for fish;

a measurement portion integral with said body portion, and including

a temperature sensing device including a temperature sens-

ing element imbedded a distance of at least about 0.06 inches within a matrix made of thermally insulating and non-wetting material; and

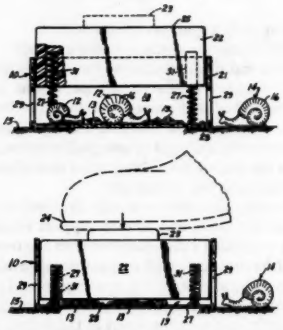


hook means for engaging a fish attracted by said body portion, whereby a temperature read by said temperature sensing device at a selected depth will be maintained by said matrix material as said lure is retrieved and the temperature at the selected depth is read.

5,072,541
METHODS AND APPARATUS FOR DESTROYING SNAILS

Milton M. T. Chang, 7 Trafalgar, Newport Beach, Calif. 92660, and Luc P. Benoit, 2551 Colorado Blvd., Los Angeles, Calif. 90041-1040

Filed Oct. 23, 1986, Ser. No. 922,164
Int. Cl.[5] A01M *23/08, 1/10*
U.S. Cl. 43—124 **34 Claims**



1. In a method of destroying snails, the improvement comprising in combination the steps of:

providing a snail trap;

having live snails cannibalize snail carcasses by providing said snail carcasses in said trap, and by making said trap accessible to said live snails for consumption of said snail carcasses; and

converting said live snails to further snail carcasses in said trap.

5,072,542
GRAVESTONE SADDLE PLANTER

Doyle Quackenbush, R.R. 11, Bedford, Ind. 47421

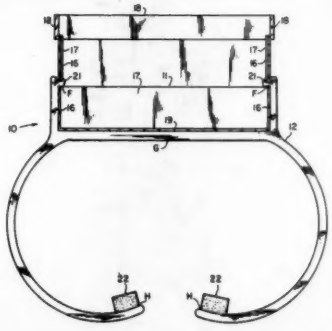
Filed Dec. 29, 1989, Ser. No. 459,121
Int. Cl.[5] A01G *17/06*
U.S. Cl. 47—41.01 **16 Claims**

1. A gravestone saddle planter device comprising:

a container;

a first substantially U-shaped resilient bracket removably attached to said container from beneath the container, said first bracket being slidable with respect to the container while attached to the container; and

a second substantially U-shaped resilient bracket attached to said first bracket and having a base and two legs extending therefrom with gripping members attached to the distal end of each of said legs, said legs of said second bracket

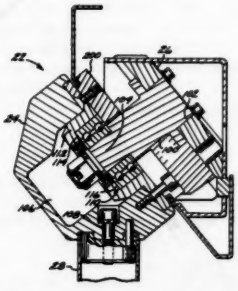


being biased towards one another at the distal ends and resiliently separable to receive the top surface of a gravestone having a width ranging from less than the width of said base of said U-shaped bracket to a width substantially greater than the width of said base of said U-shaped bracket, and wherein said gripping members removably grip opposing surfaces of the gravestone.

5,072,543
TURNSTILE MECHANISM

Cyril F. Tetherton, Poway, Calif., assignor to Cubic Automatic Revenue Collection Group, San Diego, Calif.

Filed Dec. 19, 1990, Ser. No. 633,451
Int. Cl.[5] E06B *11/08*
U.S. Cl. 49—47 **15 Claims**



1. A turnstile mechanism, comprising:

a turnstile hub support;

a turnstile hub having an interior cavity and turnstile arms extending therefrom;

a stationary turnstile hub support shaft fixed to the turnstile hub support and having a hub support end extending into the turnstile hub cavity;

a single self aligning bearing mechanism between the hub support end of the turnstile hub support shaft and an interior wall of the hub and disposed within the turnstile hub cavity, the bearing acting to support the turnstile hub from the stationary support shaft; and

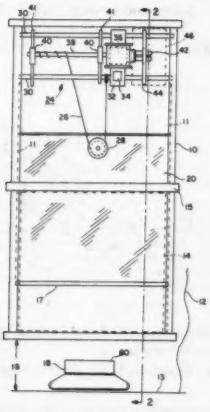
means for retaining the bearing mechanism, the means for retaining being disposed entirely within the interior cavity of the hub.

5,072,544

MOTORIZED PET DOOR APPARATUS

Louis W. Breck, Jr., Breck Technology, Rte. 1, Box 586, Anthony, N. Mex. 88021

Filed Apr. 9, 1990, Ser. No. 506,619
Int. Cl.[5] E05F *13/00*
U.S. Cl. 49—264 18 Claims



1. An apparatus for an electrically powered pet door, having an opened state and closed state, said apparatus comprising

frame means for securing to an exterior surface, said frame means includes a plurality of parallel tracks and a crossbar for a seal and a stop,

panel means slidably positioned within said parallel tracks of said frame for exposing in said opened state a panel aperture through said exterior surface, said panel means includes a pulley for hoisting said panel means,

drive means interconnected with said pulley for said panel means for vertically positioning said panel means in said opened and closed state

brake means interconnected to said drive means for regulating the vertical positioning of said panel means, and

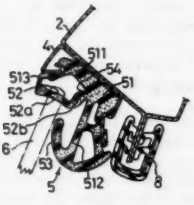
treadle means for activating said drive means.

5,072,545

WEATHER STRIP FOR DOOR GLASS

Masahiro Nozaki, Ama, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Continuation of Ser. No. 295,359, Jan. 10, 1989, abandoned. This application Jun. 28, 1990, Ser. No. 545,146
Claims priority, application Japan, Feb. 15, 1988, 63-18593[U]; May 9, 1988, 63-60959[U]; Jul. 19, 1988, 63-95914[U]
Int. Cl.[5] E06B *7/16*
U.S. Cl. 49—488 7 Claims



1. A door glass weather strip mounted along a door opening or a door frame of a motor vehicle sealing an end edge of a door glass when the door glass closes the opening, comprising:

a base portion to be mounted along the door opening or the door frame; and

a seal wall, having ends connected to said base portion to form a hollow body, a part of said seal wall being pressed into said hollow body by the end edge of the door glass when the door glass fully closes the opening;

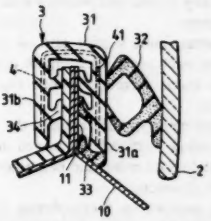
said seal wall having a first leg and a second leg integrally formed to give the seal wall an L-shape, the legs intersecting to form an elbow directed toward the door glass end edge, the first leg forming an outer portion of said seal wall with respect to said vehicle which outer portion is to be pressed by the end edge of the door glass when the opening is closed, the first leg extending in a direction nearly perpendicular to a direction in which the door glass is moved to close the opening, the first leg having a special thickness, and the second leg forming an inner portion and a root portion, said second leg being thicker than said outer portion except at the root portion which is at an end of said inner portion which is connected to said base portion, said root portion being thinner than said inner portion having a thickness substantially equal to that of said first leg whereby said inner portion is turned about said thin-walled root portion when said first leg is pressed by the end edge of the door glass.

5,072,546

WEATHER STRIP FOR USE IN AUTOMOBILE

Kazuo Ogawa, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Continuation of Ser. No. 429,372, Oct. 31, 1989, abandoned. This application Nov. 21, 1990, Ser. No. 617,260
Claims priority, application Japan, Dec. 28, 1988, 63-171502[U]
Int. Cl.[5] F06B *7/16*
U.S. Cl. 49—491 2 Claims



1. In a weather strip for mounting on a flange provided along a peripheral edge portion of an opening in a body of an automobile, comprising:

(a) a trim portion of U-shaped cross-section for being fitted on the flange, said trim portion having inner and outer side walls and holder lips which are formed on the inner surface of each of the inner and outer side walls and extend to the opposite side wall the trim portion being bent in such a manner that the opening side of said U-shaped cross section of said trim portion is directed radially outwardly of the bend when said weather strip is mounted on said flange;

(b) a seal portion formed on an outer surface of said outer side wall which is adapted to be directed toward the exterior of the automobile body when said weather strip is mounted on the flange, said seal portion protection outwardly from a generally central portion of said outer side wall and being adapted to be pressed against a closure member for closing the opening;

(c) a seal lip extending from a distal end of said outer side wall so as to be pressed against a portion of a body panel extending along the flange; and

(d) a core member embedded in said trim portion, said core member having a row of core elements spaced at a predetermined distance from one another;

said core member having consecutive portions interconnecting said core elements; when said trim portion is bent

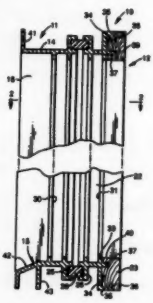
along a corner portion of the peripheral edge portion of the opening, said connective portions being disposed in said outer side wall, radially inwardly of a neutral axis of the bending when said weather strip is mounted on said flange.

5,072,547

COMBINED ALUMINUM AND WOOD FRAME FOR WINDOWS AND DOORS

Joseph DiFazio, Troy, Mich., assignor to Acorn Building Components, Inc., Detroit, Mich.

Filed Apr. 22, 1991, Ser. No. 688,850
Int. Cl.[5] E06B *1/04*
U.S. Cl. 49—504 **5 Claims**



1. A combined aluminum and wood, thermobreak type frame for mounting doors and windows in a building wall opening, comprising:

an outer, all-metal frame section and an inner metal-wood frame section, each section having an upper, a lower and parallel side frame members joined together to form a frame section;

the two sections being of substantially the same height and width and being vertically arranged in aligned, overlapped parallel relationship and being horizontally spaced apart a short distance;

a substantially continuous thermobreak strip formed of a material having a low thermal conductivity, bridging the space between the frame sections and securing the sections together into one unitary frame;

the two frame sections being of roughly the same transverse thickness, so that the thermobreak strip is roughly centered on the unitary frame between the outside and inside frame surfaces relative to the building wall;

the frame members forming the outer frame section being made of aluminum strips shaped in cross-section for enclosing and supporting a closure such as a window or door;

the frame members forming the inner frame section being divided into an interior frame and exterior frame part, which parts overlap and are joined together to form a composite inner frame, with the interior part being formed of strips of a wood material and the exterior part being formed of strips of aluminum, and with the wood interior part being rigidly connected to its adjacent aluminum exterior part;

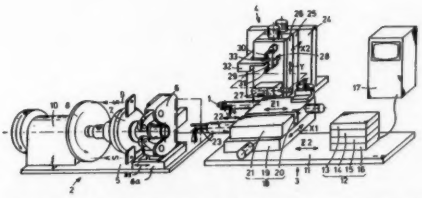
whereby the thermobreak connected exterior part of the inner frame section and the outer frame section provide a rigid, strong, structurally stable, frame structure which includes the thermobreak strip for resisting the flow of heat therebetween, and with the wood interior part of the unitary frame providing a visually attractive, but less rigid and stable, frame surface for location within a room within whose wall the frame is mounted.

5,072,548

PROCESS AND APPARATUS FOR FINISH GRINDING SPLINES OR GEAR TEETH

Francis Girard, Viroflay; Christian J. A. Marceau, Cergy St Cristophe, and Jean-Pierre G. Pouget, Argenteuil, all of France, assignors to Societe Anonyme Dite Hispano Suiza, Saint Cloud Cedex, France

Division of Ser. No. 476,778, Feb. 7, 1990, Pat. No. 5,042,205. This application Mar. 20, 1991, Ser. No. 672,868
Claims priority, application France, Feb. 8, 1989, 89 01600
Int. Cl.[5] B24B *49/00*
U.S. Cl. 51—165.87 **9 Claims**



1. A grinding apparatus for finish grinding splines or gear teeth on a workpiece comprising:

a) work holder means to hold the workpiece in a desired position;

b) a tool holder assembly having a grinding wheel movable into and out of contact with the workpiece, the grinding wheel having a peripheral portion with a cross-sectional shape for finish grinding splines or gear teeth on the workpiece;

c) impression means to form an impression of the contour of the peripheral portion of the grinding wheel after contact with the workpiece;

d) a checking head to determine the contour formed on the impression means and generate control data relating to the contour;

e) wheel sharpening means to sharpen the grinding wheel; and,

f) computer means connected with the checking head to receive the control data therefrom and connected to the work holder, the tool holder and the sharpening means to control the sharpening of the grinding wheel, the movement of the tool holder and the positioning of the workpiece.

5,072,549

METHOD OF CUTTING GEMSTONES AND PRODUCT

Harold Johnston, 8039 - 43rd Ave. N.E., Seattle, Wash. 98115

Continuation-in-part of Ser. No. 910,173, Sep. 22, 1986, Pat. No. D. 304,698. This application Sep. 5, 1989, Ser. No. 402,657
Int. Cl.[5] A44C *17/00*; B23B *9/16*
U.S. Cl. 51—283 R **16 Claims**

1. A method of cutting a gemstone comprising the steps of:

(a) cutting a planar gem table on said gemstone, said gemstone having a longitudinal axis, said gem table being approximately centered around said longitudinal axis, said gem table being approximately perpendicular to said longitudinal axis;

(b) cutting a first set of five facets, said first set of facets being approximately perpendicular to said gem table, said first set of facets giving said gem table a generally pentagonal shape, said first set of facets intersecting each other to form a first set of five edges, said first set of edges being approximately perpendicular to said gem table;

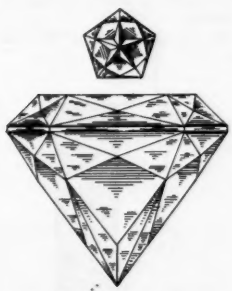
(c) cutting a third set of five facets, said first and third set of facets intersecting each other to for a second set of five edges, said second set of edges being approximately parallel to said gem table, said second set of edges forming a lower edge of a gem girdle, said third set of facets inter-

secting each other to form a third set of five edges and a third apex, said third apex being positioned approximately on said longitudinal axis opposite to said gem table;

(d) cutting a fourth set of ten facets, said third and fourth set of facets intersecting each other to form a fourth set of ten edges, said fourth set of facets intersecting each other to form a fifth set of five edges, a sixth set of five edges and a fourth apex, said fourth apex being positioned approximately on said longitudinal axis opposite to said gem table, said fifth and sixth set of edges intersecting each other at said fourth apex, said first, second, fourth and fifth set of edges intersecting each other to form a first set of five points;

(e) cutting a fifth set of five facets, said fourth and fifth set of facets intersecting each other to form a seventh set of ten edges, said fifth set of facets intersecting each other to form an eighth set of five edges and a fifth apex, said fifth apex being positioned approximately on said longitudinal axis opposite to said gem table, said eighth set of edges intersecting each other at said fifth apex, said fourth and seventh set of edges intersecting each other to form a second set of five points;

(f) cutting a sixth set of ten facets, said fifth and sixth set of facets intersecting each other to form a ninth set of ten edges, said sixth set of facets intersecting each other to form a tenth set of five edges, an eleventh set of five edges and a sixth apex, said sixth apex being positioned approximately on said longitudinal axis opposite to said gem table,



said tenth and eleventh set of edges intersecting each other at said sixth apex, said fifth, seventh, ninth and tenth set of edges intersecting each other to form a third set of five points, said ninth and eleventh set of edges intersecting each other to form a fourth set of five points;

(g) cutting a seventh set of five facets, said first and seventh set of facets intersecting each other to form a twelfth set of five edges, said twelfth set of edges being approximately parallel to said gem table, said twelfth set of edges forming an upper edge of said gem girdle, said seventh set of edges intersecting each other to form a thirteenth set of five edges, said gem table and said seventh set of facets intersecting each other to form a fourteenth set five edges;

(h) cutting an eighth set of ten facets, said seventh and eight set of facets intersecting each other to form a fifteenth set of ten edges, said eighth set of facets intersecting each other to form a sixteenth set of five edges and a seventeenth set of five edges, said first, twelfth, fifteenth and seventeenth set of edges intersecting each other to form a fifth set of five points; and

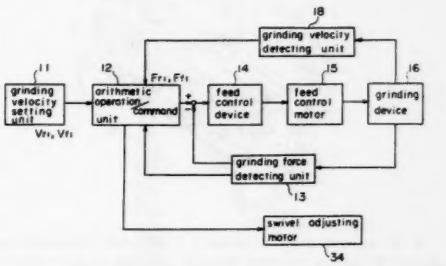
(i) cutting a ninth set of five facets, said eight and ninth set of facets intersecting each other to form an eighteenth set of ten edges, said ninth set of facets intersecting with said gem table to form a nineteenth set of five edges, said fifteenth and eighteenth set of edges intersecting each other to form a sixth set of five points, said thirteenth, eighteenth and nineteenth set of edges intersecting each other to form a seventh set of five points.

5,072,550

GRINDING METHOD AND GRINDING MACHINE WITH CONTROLLED GRINDING FORCE

Yasutami Matsumoto, Yamato, Japan, assignor to Nippon Seiko Co., Ltd., Tokyo, Japan

Filed Nov. 16, 1990, Ser. No. 614,201
Claims priority, application Japan, Nov. 27, 1989, 1-306950
Int. Cl.[5] B24B *49/00*
U.S. Cl. 51—290 **5 Claims**



1. A grinding method with controlled grinding force in rough grinding operation and finish grinding operation, said grinding method comprising:

the process of detecting a grinding velocity and a grinding force during the rough and finish grinding operations,

obtaining for each machining cycle a threshold force F_0 and a grinding wheel sharpness coefficient K out of the detected rough and finish grinding velocities and the detected rough and finish grinding forces using the following equations (1), (2):

$$K = \frac{V_r - V_f}{F_r - F_f} \times \frac{DW}{2} \tag{1}$$

$$F_0 = \frac{V_r F_f - V_f F_r}{V_r - V_f} \tag{2}$$

wherein:

V_r: detected grinding velocity in rough grinding cycle,

V_f: detected grinding velocity in finish grinding cycle,

F_r: detected grinding force in rough grinding cycle,

F_f: detected grinding force in finish grinding cycle,

D: workpiece diameter,

W: width of grinding,

calculating rough and finish grinding force command values F_{r1}, F_{f1} out of the threshold force F_0, the grinding wheel sharpness coefficient K and target grinding velocities V_{r1}, V_{f1} which have been preset, for rough and finish grinding using the following equations (3), (4):

$$F_{r1} = F_0 + \frac{V_{r1}}{K} \times \frac{\pi DW}{2} \tag{3}$$

$$F_{f1} = F_0 + \frac{V_{f1}}{K} \times \frac{\pi DW}{2} \tag{4}$$

obtaining the difference in signals between the detected grinding forces F_r, F_f and the grinding force command values F_{r1}, F_{f1} for rough and finish grinding cycles respectively, and

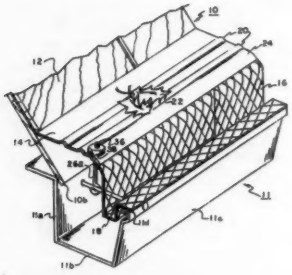
controlling each grinding wheel feeds in rough and finish grinding cycles in a manner to make said difference in signals become substantially zero and to make detected grinding forces F_r, F_f agree with said grinding force command values F_{r1}, F_{f1} respectively.

5,072,551

GUTTER GUARD

Sarkis Manoogian, Jr., 8366 Fairview Rd., Elkins Park, Pa. 19117

Filed Jan. 23, 1991, Ser. No. 644,494
Int. Cl.[5] E04D *13/00*
U.S. Cl. 52—12 **19 Claims**



1. An apparatus for covering a traditionally mounted roof gutter, the gutter attached directly adjacent to and below an edge of a roof, to prevent the accumulation of leaves and debris in the gutter, the gutter providing a conduit for the run-off of water through the combination of a back wall, a bottom surface, a front wall, and a top edge at the upper most end of the front wall, which apparatus comprises:

a shield which is attached to a pitched roof in a position spaced above and behind the roof's edge, the shield providing a surface of lesser incline than that of the roof so to low the velocity of water leaving the roof;

an arcuate screen portion attached at one end to the shield adjacent to its lowermost edge and at the other end to the front wall of the gutter, the screen having a radius which does not extend beyond a plane drawn vertically from the front wall of the gutter,

the arc of the screen being sufficient to direct water leaving the shield downward into the gutter, the water entering the gutter through the screen, while allowing leaves and debris to be shed over the front wall of the gutter; and

wherein the screen provides a trough at its lowermost edge behind the front wall of the gutter and extending below then top edge of the gutter to collect and strain water which fails to enter the gutter through the arc of the screen, the trough being of a cross-sectional width which is narrow enough the any leaves which may become trapped therein will be held in a substantially vertical position to promote their drying, while being of a cross-sectional width great enough that leaves and debris trapped therein may be easily removed.

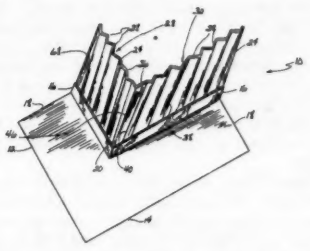
5,072,552

UNIVERSAL CORNER FLASHING SHINGLE AND FLASHING METHOD

Mark L. Sauder, P.O. Box 23, Grabill, Ind. 46741

Filed Feb. 12, 1990, Ser. No. 478,485
Int. Cl.[5] E04D *1/36*
U.S. Cl. 52—58 **16 Claims**

12. A corner flashing comprising a base having a pair of intersecting legs defining an indented corner, a wall joined in watertight relation to said base at said indented corner and upstanding from said base, said wall having side faces disposed at the angle of said corner, said faces both having an adjustable portion, said adjustable portions having a plurality of folds tapering together toward said base, said adjustable portions being non-resilently deformable into a plurality of configurations between a fully open configuration and a fully closed configuration, said adjustable portions in said fully open configuration being approximately planar, said adjustable portions in said fully closed configuration having all adjacent folds contiguous, said faces each being pivotable relative to said base



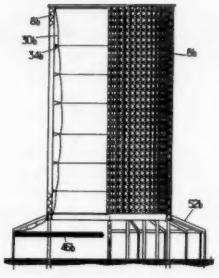
by said deformation of said adjustable portion of the other of said faces.

5,072,553

SHELL STRUCTURE FOR A COOLING TOWER

Pierre Bozetto, Saint Cyr au Mont d'Or; Jean-Marc Truchet, Amberieu en Bugey; Marcel Barret, Chazay d'Azergues, and Guy Chauvier, Lyon, all of France, assignors to Electricite de France (Service National), Paris, France

Continuation-in-part of Ser. No. 249,139, Sep. 26, 1988. This application Nov. 20, 1989, Ser. No. 438,120
Claims priority, application France, Sep. 28, 1987, 8713375; Jun. 30, 1988, 8808833
Int. Cl.[5] B01F *3/04;* **E04B** *1/32*
U.S. Cl. 52—63 **11 Claims**



1. Cooling tower comprising:

an upright frame having a vertical axis supported by ground foundations, having three intersecting sets of bars defining a grid, one of the sets comprising substantially horizontal bars so located and connected as to constitute circumferential girdles vertically distributed along the frame while the other two sets comprises bars which are at angles with said horizontal bars, the bars of one of said other sets having an angle with the horizontal bars opposed to the angle of the bars of the other one of said two other sets, said bars being connected by assembling nodes each receiving bars belonging to all three of said sets and located at the nodal points of a substantially equilateral triangular network, said assembling nodes being distributed along a plurality of axially spaced horizontal rows;

an annular veil defining a substantially continuous airflow guide stack, located within said frame and approximately parallel thereto and having an opening into the atmosphere;

means for individually connecting said veil to only some of said nodes and maintaining said veil under tensile stress, said some of said nodes belonging to first ones of said rows which are separated by other ones of said rows which are

separated from said veil and which are distributed throughout the axial length of the frame; and

said annular veil including a plurality of vertically adjacent horizontal ring-shaped bands, and a separate connection means extending circumferentially within said frame for connecting adjacent bands and said separate connection means being secured to adjacent nodes in a horizontal plane.

5,072,554

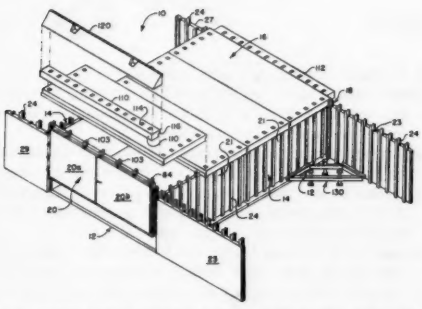
PREFABRICATED MODULAR STORAGE BUILDING

Lowell K. Hayman, Ogden, Utah, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 27, 1990, Ser. No. 515,398

Int. Cl.[5] E04H *9/04, 9/10*

U.S. Cl. 52—79.1 **10 Claims**



1. A prefabricated modular building suitable for storing high energy explosives, said building having a floor, a rear wall, extendable side walls, a roof supported between each side walls, and a full width front door frame, the combination comprising:

a floor comprising a plurality of rectangular floor panels laid side by side on a level foundation, said floor having equispaced floor receptacles around the side and rear perimeter thereof, said receptacles being sized for vertically receiving a plurality of a plurality of downward projecting beams;

a plurality of identical aligned side wall panels, said panels having said vertical beams projecting above and below said panels, the lower end of said beams being inserted into said rear wall floor receptacles, said panels also having an elongated flange projecting from one end of each panel and a complementary channel member in the other end of said panel, said flange being inserted into the channel of an abutting panel to interlock adjacent panels;

a plurality of identical interlocked rectangular roof panels extending between and supported by said side wall panels, said roof panels having spaced roof receptacles complementary to the beams of said side wall panels for vertically receiving the upward projecting beams of said side wall panels; and

a rear wall panel having vertical beams projecting above and below said panels, the lower end of said beams being inserted into said floor receptacles, said rear wall panels also having an elongated vertically extending flange projecting from said rear wall panel adjacent one end thereof, and a complementary channel member in the other end of said rear wall panel, the flange of said rear wall panel being inserted into the channel of an abutting side wall panel on one side to form one interlocked rear corner, the flange of the other abutting side wall panel being inserted vertically into the channel of said rear wall panel to form a second interlocked rear corner on the other side.

5,072,555

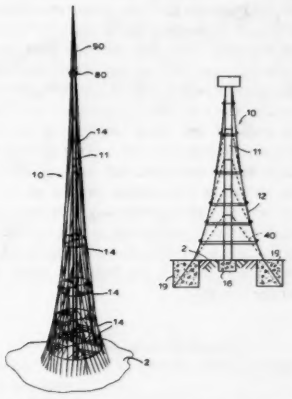
SUPER HIGH-RISE TOWER

David H. Geiger, Kirby La., Rye, N.Y. 10580

Continuation-in-part of Ser. No. 276,456, Nov. 25, 1988. This application Oct. 12, 1989, Ser. No. 420,585

Int. Cl.[5] E04B *1/32*

U.S. Cl. 52—82 **28 Claims**



1. A super high rise tower comprising a core having a predetermined height and being formed of rigid materials for receiving a compressive force, a plurality of anchor cables having upper ends fixed to said core at the outer circumference thereof for supporting said core, said anchor cables being fixed to the core at different elevations thereof, said anchor cables having lower ends fixed to the ground, means for pretensioning said anchor cables, and prestressed hoop cables horizontally provided at outer circumferences of said anchor cables, and being secured thereto, said cables forming a cable network and said prestress in the cables maintaining a balance between a compression stress of said core and the prestress of said cable network.

5,072,556

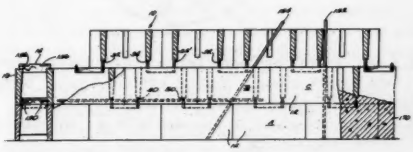
WALL ASSEMBLY CONSTRUCTION

George G. Egenhoefer, 3675 S. Loretta La., New Berlin, Wis. 53151

Filed Dec. 20, 1989, Ser. No. 453,679

Int. Cl.[5] E04B *2/44*

U.S. Cl. 52—126.4 **37 Claims**



1. A wall assembly comprising:

a plurality of building blocks arranged in vertically stacked horizontal rows, each of said building blocks including first and second spaced apart sidewalls, said sidewalls including opposed spaced apart inner surfaces, and each sidewall inner surface including an upper edge portion and a lower edge portion, a web disposed between said sidewalls and rigidly interconnecting said sidewalls, a first slot formed in one edge portion of an inner surface of one of the sidewalls, a second slot formed in said one edge portion of an inner surface of one of the sidewalls, and a

third slot formed in the other edge portion of an inner surface of one of said sidewalls; and

a plurality of restraining members adapted to interconnect said building blocks to thereby prevent relative horizontal movement between said building blocks, said restraining members each being adapted to connect together at least a pair of building blocks of one row and at least one building block of an adjacent row, each of each restraining members being located at least partially between said sidewalls, and each of said restraining members including a pair of block connecting members, said block connecting members each including opposite ends, a portion of one of said opposite ends of one of the block connecting members being housed in one of said first and second slots in a block in the one row, and a portion of one of the opposite ends of the other connecting member being housed in one of said first and second slots in another of said blocks in the one row, and each of said restraining members including a transverse member at least partially disposed between said connecting members and rigidly interconnecting said connecting members, said transverse member including a projection adapted to be housed in said third slot in at least one building block of the row adjacent the one row.

5,072,557

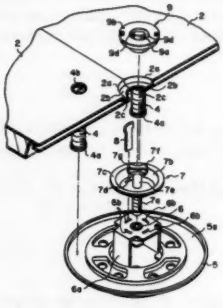
DEVICE FOR FIXING FLOOR PANELS

Hiromasa Naka; Norio Nakamura; Takehiko Okushima; Takao Okumura; Tatsuo Shoji, and Tetsuo Tobikawa, all of Tokyo, Japan, assignors to Naka Corporation, Tokyo, Japan

Filed Oct. 25, 1990, Ser. No. 601,658

Int. Cl.[5] E04B *5/00*

U.S. Cl. 52—126.6 **11 Claims**



1. A device for fixing floor panels to be mounted on a surface of a base floor by means of support legs which permit vertical adjustment of the floor panels, comprising:

a retainer plate fixed to the base floor for receiving the support legs therein;

a support member extending vertically from said retainer plate and having an internally threaded portion;

a panel holder; and

a bearing member for said panel holder, said bearing member having one end thereof threaded into said internally threaded portion of said support member for rotatable movement of said bearing member relative to said retainer plate, said bearing member being accessible through the floor panels for operation thereof;

said panel holder being adapted to be engageable with said bearing member for fixing the floor panels.

5,072,558

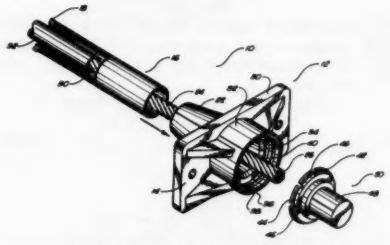
POST-TENSION ANCHOR SYSTEM

Felix L. Sorkin, Houston, and Norris O. Hayes, Sugar Land, both of Tex., assignors to Varitech Industries, Inc., Stafford, Tex.

Continuation-in-part of Ser. No. 184,535, Apr. 21, 1988, Pat. No. 4,896,470. This application Jan. 23, 1990, Ser. No. 468,574

Int. Cl.[5] E04C *5/12, 3/26*

U.S. Cl. 52—230 **21 Claims**



1. A tendon tensioning anchor comprising:

a base member having a tubular section extending therefrom, said tubular section having a sloping annular interior wall for receiving an end of a tendon;

a polymeric encapsulation in surface-to-surface contact with an exterior surface of said base member and an exterior surface of said tubular section, said polymeric encapsulation having a receiving area extending outwardly beyond an end of said tubular section; and

a heat shield embedded within said polymeric encapsulation adjacent an end of said tubular section, said heat shield being an annular member of a material having greater heat resistance than said polymeric encapsulation.

5,072,559

BUILDING STRUCTURE HAVING STACKED WOODEN BEAM WALLS

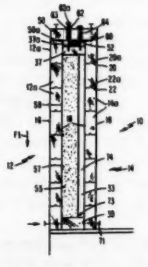
Said D. Liljegren, Rte. 631, Leon, Va. 22725

Continuation of Ser. No. 273,374, Nov. 18, 1988, Pat. No. 4,976,079. This application Jun. 29, 1990, Ser. No. 546,199

The portion of the term of this patent subsequent to Dec. 11, 2007, has been disclaimed.

Int. Cl.[5] E04B *1/10*

U.S. Cl. 52—233 **3 Claims**



1. A building wall, comprising:

(a) a plurality of elongated beam members extending in stacked relationship to each other to define a wall;

(b) support means engageable with opposite ends of said stacked beams to maintain said beams in stacked relationship, said beams being subjected to settlement relative to a lower support surface on which said wall rests as a result of air drying of said beams; and

(c) a first connecting vertical stud mounted to the beams to support an interior stud wall and the like adapted to ex-

tend outwardly from the stacked beam wall, said first connecting stud having at least one elongated slot extending through a wide face thereof along the length of the stud, screw means extending through an upper portion of said at least one slot into threaded clamping contact with an underlying one of the wooden beam, whereby settlement of said beams after construction enables the screw means to descend through the slot without transmitting the settling movement of the beams to the first connecting stud and interior wall attached thereto.

5,072,560

Patent Not Issued For This Number

5,072,561

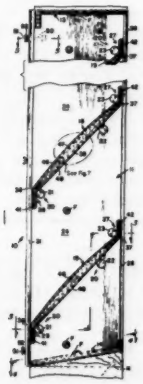
PREFABRICATED LOUVER

William V. Pitt, 447 Champion Dr., Brownsville, Tex. 78520

Filed Jun. 26, 1990, Ser. No. 543,522

Int. Cl.[5] E06B *7/08*

U.S. Cl. 52—473 **31 Claims**



10. A prefabricated louver comprising a leat two side walls adapted to be positioned in upstanding generally parallel relationship to each other, a plurality of slats adapted to be positioned in generally vertical spaced relationship to each other and in spanning relationship between said side walls, each of said plurality of slats having opposite terminal end portions, a plurality of locating means arranged in a plurality of vertically spaced sets along each side wall for cooperatively interactingly locating an associated slat terminal end portion whereby said slats are located in vertical spaced relationship to each other, emans for maintaining said locating means and terminal end portions in assembled relationship with each other; and each of said side walls, each of said plurality of slats and each of said plurality of locating means being constructed from a core of solidified resin impregnated permeable material and an exterior surface of polyester resin material resistive to chemical and corrosive attack.

5,072,562

DECORATIVE WALL COVERING

Dallas M. Crick, Pembroke Pines, Fla.; James G. Perkins, Wilmette, Ill., and Douglas F. Hudson, Jr., Miami, Fla., assignors to Nailite International, Miami, Fla.

Filed Mar. 5, 1990, Ser. No. 487,910

Int. Cl.[5] E04O *1/26*

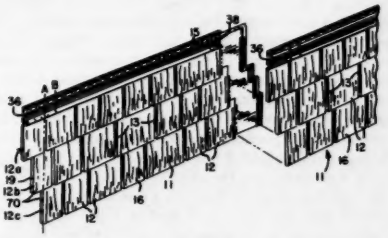
U.S. Cl. 52—533 **47 Claims**

1. A wall covering for mounting on a support surface disposed at an angle to the horizontal comprising

a plurality of panels each having a relatively thin body portion formed with simulated building elements, said panels each have right-side and left-side marginal edge regions,

said panels being mountable on said support surface in a plurality of vertically spaced horizontal courses with the left-side and right-side marginal edge regions of adjacent panels in overlapping relation, and

said overlapping side marginal edge regions defining water barrier means in the form of a plurality of vertically oriented ridges disposed inwardly from the peripheral edges of the side marginal edge regions for impeding the movement of water laterally outwardly toward the peripheral edge of the underlying side marginal edge region.



5,072,563

MODULAR ROOFING PANEL

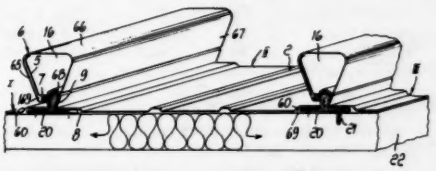
Fabio Menegoli, San Pietro in Cariano, Italy, assignor to Iscom S.r.l., Verona, Italy

Continuation of Ser. No. 237,925, Aug. 29, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 541,432

Claims priority, application Italy, Sep. 8, 1987, 84965 A/87

Int. Cl.[5] F04D *1/28, 1/34, 1/36*

U.S. Cl. 52—537 **2 Claims**



1. A roofing panel assembly comprising a plurality of mutually juxtaposed roofing panels, each of said roofing panels having a lateral extension and a longitudinal extension and

wherein at least a first adjacent, a second adjacent and a third adjacent of said roofing panels comprise each on one longitudinal side thereof a first lateral longitudinally extending edge formation, on the opposite longitudinal side thereof a second lateral longitudinally extending edge formation laterally at a distance from said first lateral edge formation, and an intermediate body portion between said first lateral edge formation and said second lateral edge formation, said intermediate body portion defining a plane of lay of the roofing panel, and

wherein said first adjacent, said second adjacent and said third adjacent of said roofing panels are in juxtaposed relationship to each other, said second adjacent of said roofing panels being arranged between said first adjacent and said third adjacent of said roofing panels,

wherein said first adjacent roofing panel is arranged with said second lateral edge formation thereof at the side of said first lateral edge formation of said second adjacent of said roofing panels and in overlapping relationship therewith,

wherein said third adjacent roofing panel is arranged with said first lateral edge formation thereof at the side of said second lateral edge formation of said second adjacent of said roofing panels and in overlapping relationship therewith,

wherein said first lateral edge formation comprises a longitu-

dinal leg defining wall upwardly extending with respect to said intermediate body portion and, at the bottom of said leg defining wall at a level higher than the level of said plane of lay of said intermediate body portion, a first folded wall portion connecting said leg defining wall with said intermediate body portion, said first folded wall portion having an upwardly facing through-like surface area defining a drain channel portion and, on the reverse side thereof, a downwardly facing surface area defining a first seat means arranged below said drain channel portion, wherein said second lateral edge formation has substantially an elongated box-like shape comprising a first upwardly extending side wall, a second folded wall portion connecting the bottom of said first side wall to said intermediate body portion, said second folded wall portion facing said first folded portion at a distance therefrom to form and interspace therebetween and cooperating with said first seat means in assembled condition of said roofing panels, said first side wall having a prevailing portion thereof extending substantially parallel to and facing said leg defining wall of said first edge formation in assembled condition of said roofing panels, said box-like shape comprising further a free upwardly extending side wall at a lateral distance from said first upwardly extending side wall to leave free a duct cavity therebetween, a top wall connecting upwardly said first side wall and said free side wall and a rib-like bottom wall extending from the bottom of said free side wall towards said first side wall at a distance therefrom to leave a gap therebetween, said gap allowing passage therethrough of said leg defining wall of said first edge formation and cooperating therein with said first seat means thereof when said first edge formation and said second edge formation are in overlapped relationship to each other whereby said first edge formation and said second edge formation define a draining duct encircling said draining channel of said first edge formation, whereby the bottom of said draining duct defined by said rib-like bottom wall and said draining channel is arranged at a level higher than the level of said plane of lay of said intermediate body portion of the roofing panel,

wherein the roofing assembly further comprises at least one clamp means having a hook formation and a base formation, said hook formation being engaged in said first seat means between said first folded wall portion and said second folded wall portion and being adapted to hook said second folded wall portion, said base formation being adapted to be fastened to a deck,

wherein said first folded portion has at least two consecutive folds and wherein said second folded wall portion has at least two further consecutive folds facing respectively said two consecutive folds of said first folded wall portion to define two consecutive seats for said clamp means.

5,072,564

DECORATIVE PANEL

James W. Campana, Belle Vernon, Pa., assignor to Campana Technology, Inc., Belle Vernon, Pa.

Division of Ser. No. 255,741, Oct. 11, 1988, Pat. No. 4,913,579. This application Dec. 29, 1989, Ser. No. 458,944

Int. Cl.[5] A47B *96/00;* **F16B** *12/12*

U.S. Cl. 52—586 **5 Claims**

1. An interlocking element for interlocking pieces of a frame, said interlocking element for interlocking ends of the pieces, the ends of the pieces for being disposed to align dove-tail slot means in the ends of the pieces to form a double dove-tail slot, said interlocking element comprising:

an internal portion and an external portion;

said internal portion comprising:

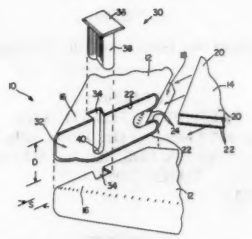
a double dove-tail element for being disposed in the double dove-tail slot of the pieces when the pieces are aligned;

said double dove-tail element having a first end for being inserted into the double dove-tail slot means;

a second end opposite said first end;

said external portion comprising cap means adjacent said second end of said internal portion, said cap means being for overlying the aligned double dove-tail slot means and an area about the double dove-tail slot means when said interlocking element is inserted into the double dove-tail slot means;

said double dove-tail element comprises at least one serrated interlocking surface, said serrated interlocking surface for



deforming an interior surface of the aligned double dove-tail slot for frictional engagement between the interior surface of the double dove-tail slot and said double dove-tail element when said interlocking element is disposed within the aligned dove-tail slot; and

said first end is at least partially rounded for aligning said interlocking element with the aligned double dove-tail slot during the insertion of said interlocking element into the aligned double dove-tail slot.

5,072,565

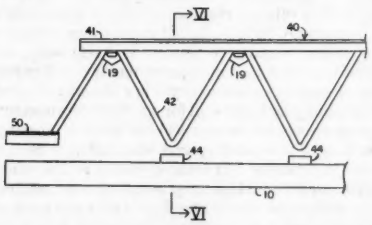
PRE-CAST CONCRETE WALL PANEL AND JOIST ASSEMBLY AND METHOD OF CONSTRUCTION

Don Wilnau, 907 Hibernia Forest Dr., Green Cove Springs, Fla. 32043

Filed Dec. 19, 1989, Ser. No. 452,722

Int. Cl.[5] E04C *2/50*

U.S. Cl. 52—600 **12 Claims**



1. A pre-cast concrete panel and joist assembly comprising:

(A) a concrete panel substantially rectangular in configuration;

(B) at least one joist attached to said concrete panel, said joist having an exterior chord and an interior chord made of angle iron, and webbing material alternating between said chords;

(C) joist attachment means for attaching said exterior chord of said joist to said concrete panel,

(D) bridging members to stabilize said joist;

(E) apertured plates attached to said joist;

(F) bridging anchor members attached to said concrete panel;

where said bridging members are substantially V-shaped bridging members having two legs and a slot at the main angle, where said bridging members extend through said apertured plates, said slot interlocking with said apertured

plate, and where said legs are attached to said bridging anchor members.

5,072,566

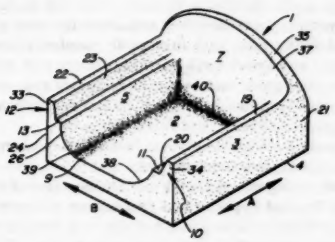
LANDSCAPING BLOCK

Philip A. Zeidman, 100 Foley Ave., Santa Rosa, Calif. 95401

Filed Sep. 24, 1990, Ser. No. 586,817

Int. Cl.[5] E04B 5/04; E04C 2/04

U.S. Cl. 52—608 20 Claims



1. A landscaping block comprising:

a bottom wall;

a first sidewall extending in a longitudinal direction along a first side of said bottom wall;

a second sidewall extending in said longitudinal direction along a second side of said bottom wall;

an end wall extending in a transverse direction along a first end of said bottom wall and between said first sidewall and said second sidewall;

said first sidewall, said second sidewall and said end wall extending upwardly away from an upper surface of said bottom wall; and

means for preventing longitudinal and lateral displacement of individual blocks, each of which is identical to said block, when the blocks form a retaining wall wherein the end wall of each of the blocks faces the same direction, a lower end of the first sidewall of a first one of the blocks overlies an upper end of the second sidewall of a second one of the blocks and a lower end of the second sidewall of the first one of the blocks overlies an upper end of the first sidewall of a third one of the blocks, the means comprising:

a first step extending in said longitudinal direction on an upper surface of said first sidewall;

a second step extending in said longitudinal direction on an upper surface of said second sidewall;

a third step extending in said longitudinal direction on a lower surface of said bottom wall, said third step being located adjacent said first sidewall;

a fourth step extending in said longitudinal direction on said lower surface of said bottom wall, said fourth step being located adjacent said second sidewall; and

a fifth step extending in said transverse direction on said lower surface of said bottom wall, said fifth step being located adjacent a second end of said bottom wall, said second end of said bottom wall being opposite to said first end of said bottom wall.

5,072,567

NON-SHRINKABLE CARRIER

John E. Cook, Aslockton, and James Matsumiya, Gerrards Cross, both of United Kingdom, assignors to Schlegel (UK) Holdings Limited, Seacroft, United Kingdom

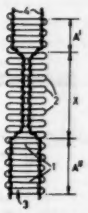
Filed Apr. 12, 1990, Ser. No. 508,955

Claims priority, application United Kingdom, Apr. 21, 1989, 8909077; Apr. 21, 1989, 8909078

Int. Cl.[5] E04F 19/02

U.S. Cl. 52—716 10 Claims

1. An elongate strip carrier for use as a stiffening member, comprising a plurality of longitudinally spaced, transversely extending members and at least one zig-zag member running longitudinally of the carrier and intersecting the transversely extending members at a plurality of crossing points, said zig-zag member being welded or otherwise rigidly secured to the



transversely extending members at the crossing points by connecting means that do not otherwise limit extension of the carrier, for maintaining said transversely extending members in their spaced relationship while allowing a limited controlled amount of extension.

5,072,568

Patent Not Issued For This Number

5,072,569

BUILDING PANELS AND METHOD THEREOF

James VanTassel, 608 Elk St., Franklin, Pa. 16323

Filed Aug. 13, 1990, Ser. No. 566,058

Int. Cl.[5] E04B 1/00

U.S. Cl. 52—745 8 Claims

1. A method of making a building panel with a support frame for wall, roof and floor construction comprising:

providing a panel of foam thermoplastic having a first side, a second side, an upper end, a lower end, a first edge, a second edge, and a width,

providing relatively thin metallic studs, and a top channel and a lower channel, each channel having flanges,

said top channel and said lower channel each having a length substantially equal to the width of said panel,

said method further comprising forming laterally spaced longitudinally extending recesses in said panel,

said recesses extending from said upper end of said panel to said lower end of said panel,

said recesses being shaped to receive said studs and to provide lateral support for said studs,

inserting said studs into said recesses from said upper end of said panel to said lower end of said panel,

attaching said studs to said top channel and to said lower channel,

inserting said lower end of said panel into said lower channel,

inserting said upper end of said panel into said top channel and,

attaching said top channel and said lower channel to a building structure.

5,072,570

SEISMIC REINFORCEMENT STRUCTURE

Michael I. Johnson, 129 Paseo de las Delicias, Redondo Beach, Calif. 90277

Filed Jun. 8, 1990, Ser. No. 535,174

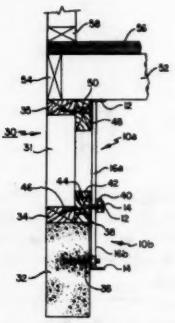
Int. Cl.[5] E04B 1/36, 1/98

U.S. Cl. 52—747 6 Claims

1. An earthquake-resistant reinforcement method for an existing wood frame structure having a concrete foundation, an original wood member supported by said foundation, and a

cripple wall supported on said original wood member comprising the steps of:

(a) providing a first elongated truss member comprising spaced first and second L-shaped sections connected together by angled brace members;



(b) providing a first additional wood member;

(c) securing said first additional wood member to said cripple wall; and

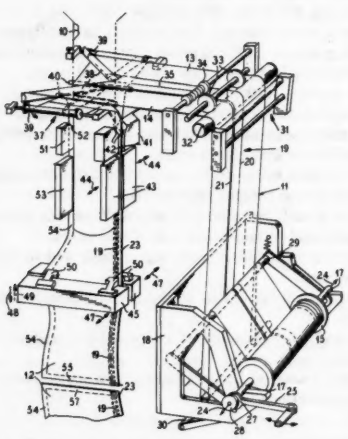
(d) securing said first L-shaped section of said truss member to said first additional wood member.

5,072,571

ZIPPERED FILM PLURAL SHEET STRIP GUIDE SYSTEM AND METHOD FOR ZIPPERED FILM FOR FORM, FILL AND SEAL PACKAGE MAKING MACHINES

Hugo Boeckmann, Arlington Heights, Ill., assignor to Zip-Pak Incorporated, Northbrook, Ill.

Filed Feb. 26, 1990, Ser. No. 484,509
Int. Cl.[5] B65B *9/02, 61/18*
U.S. Cl. 53—133.4 **9 Claims**



1. A form fill and seal bag making mechanism comprising in combination:

support means supporting and feeding a film bag material of two sheets each having first and second peripheral edges and including a profile structure defining pressure interlocking rib and groove members on the sheets adjacent said first peripheral edges and extending in a predetermined direction with respect to said sheets;

a filling tube positioned to receive the film thereabout;

means wrapping the film over the filling tube with said first edges adjacent one another and said second edges one another;

guiding and closing means interlocking said rib and groove members as the sheets are fed over said tube, said guiding and closing means comprising a plurality of guide members, oriented in pairs, in which in each pair a first of said guide members is fixedly mounted and oriented at an angle with respect to the predetermined direction of travel of the respective sheet, a second guide member is rotatably mounted on an axis generally parallel to said predetermined direction of travel of the respective sheet, and a third guide member is rotatably mounted to receive the respective sheet thereover and direct the same parallel to said filling tube, said first guide member reversing the upper and lower surfaces of said sheets and said second and third guide members each including grooves therein for receiving and guiding said rib and groove members for alignment adjacent said filling tube;

first sealing means joining said first edges outwardly of the rib and groove members; and

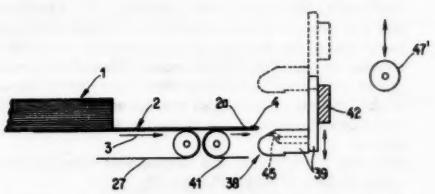
second sealing means joining said second edges of said sheets and located opposite said first sealing means relative to said filling tube so that a bag sleeve is formed for cross-sealing and making a plurality of bags.

5,072,572

METHOD AND APPARATUS FOR WRAPPING FOLIO REAMS AND THE LIKE

Otis Meives, newton; Andrew B. Pritzl, Madison, and Charles H. Sauder, Sheboygan, all of Wis., assignors to Pemco Inc., Sheyboygan, Wis.

Filed Feb. 28, 1990, Ser. No. 487,030
Int. Cl.[5] B65B *11/12*
U.S. Cl. 53—209 **12 Claims**



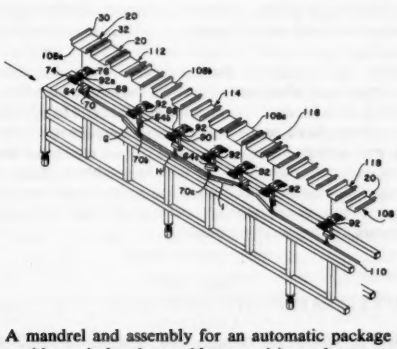
1. Apparatus for draping stacks of sheets or analogous block-shaped commodities into wrapping material, comprising conveyor means for advancing a series of successive commodities in a predetermined direction along a predetermined path wherein each commodity has front, rear, lateral, top and bottom sides; means for introducing successive panels of wrapping material into a predetermined portion of said path so that the bottom side of each commodity comes to rest on and advances with a discrete panel and each panel has front, rear and lateral portions extending beyond the corresponding sides of the respective commodity; means for squaring successive conveyor-advanced commodities of said series in a second portion of said path upstream of said predetermined portion, including means for shifting the lateral sides of successive commodities into predetermined planes, at least one abutment movable into said path to be engaged by the front side of an oncoming conveyor-advanced commodity while the lateral sides of the commodity are located in or close to said planes, and means for moving said at least one abutment into said path for engagement by an oncoming commodity and from said path in response to engagement of the abutment by a conveyor-advanced commodity so that the commodities need not come to a halt in the second portion of said path; a first folding unit having means for folding the rear portions of successive panels upwardly against the rear sides and forwardly against the top

sides of the respective commodities; and a second folding unit having means for folding the front portions of successive panels upwardly against the front sides and rearwardly against the top sides of the respective commodities; said folding means of said first unit comprises a carriage, means for moving said carriage in and counter to said direction along a second path adjacent said predetermined path, a plurality of folding elements mounted on said carriage, and means for pivoting said elements into and away from engagement with the rear portions of successive panels about an axis extending substantially transversely of said paths; said folding means of said second unit comprises a plurality of T-shaped folding members extending transversely of said path and having suction means for attracting the leaders of oncoming front portions of successive panels, said members being movable between a lower position in which they attract the oncoming leader and a raised position above said path so that the respective front portion extends across said path and is folded against the front and top sides of the respective commodity as a result of advancement of the commodity in said direction, and means for moving said members between said lower and raised positions; said conveyor means includes a plurality of endless, parallel conveyors spaced apart from each other transversely of said direction and defining a plurality of gaps extending in said direction, each of said folding members and elements being movable up and down in said gaps.

5,072,573
APPARATUS WITH ADJUSTABLE WIDTH TRAYS FOR AUTOMATIC PACKAGING MACHINES

Stevan Tisma, Chicago, Ill., assignor to Tisma Machine Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 464,162, Jan. 12, 1990. This application Apr. 11, 1990, Ser. No. 508,269
Int. Cl.[5] B65B *5/06*; B65G *17/12*
U.S. Cl. 53—252 **18 Claims**

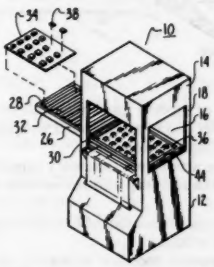


1. A mandrel and assembly for an automatic package machine, said mandrel and assembly comprising at least one conveyor having a plurality of tray supports attached thereto and at periodic locations along the length thereof, means associated with said tray support for moving a tray between a loading position and a packaging position as said conveyor moves said tray supports along a predetermined path, a tray comprising two L-shaped side members which overlap in the center of said tray, whereby said tray telescopes between wide and narrow configurations, tray width control means for moving said side members between preselected positions to telescope said tray and change its width responsive to said conveyor movement along said predetermined path, two slots extending along said predetermined path, said tray width control means comprising two cam followers mounted on said tray to follow individually associated ones of said slots, means responsive to a movement of said cam followers for telescoping said tray whereby the width of said tray is adjusted by the position of said slot relative to said tray, each of said cam followers being mounted on the bottom of an individually associated rotary mounted vertical shaft, a pair of lever arms coupled to each of said rotary shafts and extending from said coupling to an associated one of said side members, means responsive to a movement of each of said cam followers for moving an individually associated one of said side members whereby said lever arms pull or push said side members responsive to a rotation of an associated one of said shafts, and the telescoped position of said side members are individually controlled by the contour of the slot in which its associated cam follower moves.

5,072,574
VACUUM PACKAGING MACHINE

Cecil E. Puett, Las Vegas, Nev., assignor to Sunclipse, Inc., Montebello, Calif.

Filed May 15, 1990, Ser. No. 524,149
Int. Cl.[5] B65B *11/52*
U.S. Cl. 53—427 **11 Claims**



11. A method of vacuum packaging comprising the steps of:

providing an apparatus having a base, a heating hood mounted on said base, said base being formed with a first side having a first access and a second side opposite said first side having a second access for defining a product work area between said sides, a reciprocally moveable table mounted on said base, said table comprising a first packaging well and a second packaging well juxtaposed therewith, a sealing frame movably mounted on said base for holding a sheet of wrapping material, and a vacuum means mounted on said base;

placing a first backing board into said first packaging well and placing a product on said first backing board;

placing a first sheet of wrapping material in said sealing frame;

raising said sealing frame and said first sheet into a heating position adjacent said stationary hood to heat said sheet;

moving said first packaging well and said first packing board through said first access into said work area and simultaneously moving said second packaging well and said second backing board through said second access out of said work area;

lowering said sealing frame and said heated sheet onto said first backing board;

applying a vacuum to said first backing board to seal said heated sheet onto said first backing board;

placing a second backing board into said second packaging well and placing a product on said second backing board;

placing a second sheet of wrapping material in said sealing frame;

raising said sealing frame and said second sheet into said heating position;

moving said second packaging well and said second backing board through said second access into said packaging work area and simultaneously moving said first packaging well and said first backing board out through said first access out of said work area;

lowering said sealing frame and said heated sheet onto said second backing board while removing said first backing board from said first packaging well;

applying a vacuum to said backing board to seal said second heated sheet onto said second backing board; and

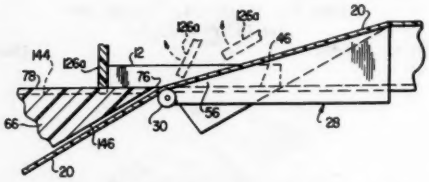
repeating said steps as necessary.

5,072,575

METHOD OF FEEDING ARTICLES INTO A HORIZONTAL WRAPPING MACHINE

Lawrence D. Lakey, 4628 O'Connor Ct., Irving, Tex. 75062

Division of Ser. No. 387,959, Jul. 31, 1989, Pat. No. 4,967,541.
This application Nov. 5, 1990, Ser. No. 609,261
Int. Cl.[5] B65B *35/24, 9/20*
U.S. Cl. 53—450 7 Claims



1. A method of feeding an article into the open wrapping material tube inlet end of a horizontal wrapping machine, said method comprising the steps of:

positioning the article in a stationary support surface having a forward exit and disposed rearwardly adjacent the tube inlet ends;

positioning a pusher member above said support surface and behind said article;

moving said pusher member forwardly along said support surface beside the article therealong past said exit end into the tube inlet end;

moving said pusher member upwardly without forward acceleration which would tend to accelerate the article; and

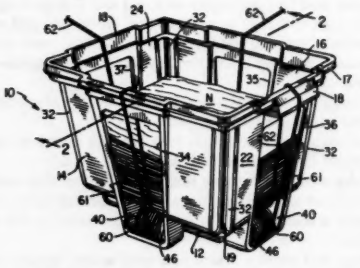
moving said pusher member horizontally outwardly away from said tube inlet end prior to appreciable entry of said pusher member into the tube inlet end.

5,072,576

NEWSPAPER BUNDLER

David L. Evans, Acton, Mass., assignor to Tucker Housewares, Leominster, Mass.

Filed Sep. 26, 1990, Ser. No. 588,687
Int. Cl.[5] B65B *27/08, 13/00*
U.S. Cl. 53—592 14 Claims



1. An article bundler comprising:

a container having upwardly extending connected front, rear and side walls and a bottom onto which the article is to be placed, the upper edges of the container front, rear and side walls being connected by a continuous peripheral rim,

a hollow pedestal base extending below said bottom and having its own bottom wall to rest on a surface,

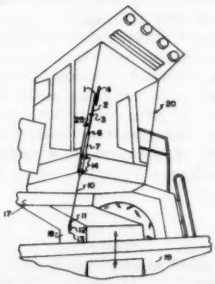
at least one compartment extending from one of said container front, rear and side walls below said container bottom for holding a supply of cord, said compartment formed by opposed side walls extending below said container bottom and a bottom cross piece connecting said compartment side walls.

5,072,577

CUTTING HEIGHT GUAGE

Ernest C. Lokken, Box 1345, Weyburn, Saskatchewan, Canada S4H 3J9

Filed Aug. 27, 1990, Ser. No. 573,324
Int. Cl.[5] A01D *67/00*
U.S. Cl. 56—208 14 Claims



13. In a harvesting machine having a frame, an operators cab fixed to the frame and including a frontal viewing area, an adjustable working head moveably mounted on the frame and a working head position indicator mounted on said operators cab, said working head position indicator comprising, scale means attached to said operators cab at the frontal viewing area, an elongated glass rod indicator moveable relative to said scale means and in close proximity thereto, a slim tubular body member mounted on said operators cab, an elongated biasing means having an upper end attached to said slim tubular body member, said elongated biasing means, internally slideably supporting said elongated glass rod indicator, an adjustable working head fastener is connected at a first end to said adjustable working head and at a second end simultaneously to said glass rod indicator and a lower end of said elongated biasing means whereby movement of said adjustable working head causes a movement of said glass rod indicator past said scale means to give an operator a visual indication of the degree of movement of the working head.

5,072,578

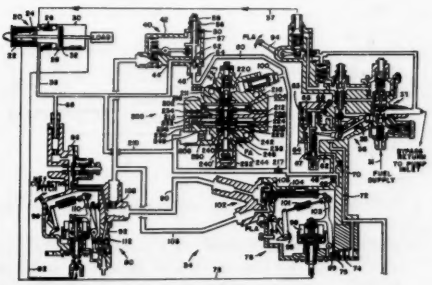
ACCELERATION OVERRIDE MEANS FOR A FUEL CONTROL

Robert G. Moore, Jr., Granger, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Dec. 14, 1989, Ser. No. 450,797
Int. Cl.[5] F02C *7/28*
U.S. Cl. 60—39.281 10 Claims

1. In a gas turbine having at least one compressor, a housing with a first chamber and a second chamber located therein, a main fuel passage connected to a source of fuel, a metering valve located in said main fuel passage for controlling the flow of fuel from the source to a combustion chamber, said compressor rotating as a result of the combustion of fuel in the combustion chamber to develop a compressor discharge pressure P_c in an operational fluid, a control system for operating said metering valve in accordance with a fuel supply schedule corresponding to a desired rotational speed for said compressor, temperature responsive means for modifying said compressor discharge pressure in said operational fluid from P_c to P_x, bellow means for separating said first chamber from said second chamber and connected to said metering valve, a first

passageway connected to said temperature responsive means for communicating said operational fluid having modified compressor discharge pressure P_x to said first chamber, a second passageway connecting said first passageway to said second chamber, said first passageway having a first bleed orifice located therein and said second passageway having a second bleed orifice located therein, a lever arrangement having a face on the end thereof located adjacent said second bleed orifice and responsive to an input signal applied to a power lever by an operator, said lever arrangement being responsive to the rotational speed of said compressor for controlling flow of operational fluid from said second passageway through said second bleed orifice to establish a fluid pressure P_y in the operational fluid presented to said second chamber, said bellow means responding to a pressure differential $P_x - P_y$ created in the operational fluid by the modified compressor fluid pressure P_x in the first chamber and fluid pressure P_y in the second



chamber to provide said metering valve with an operational input to limit the maximum fuel supplied to said turbine according to said fuel supply schedule, the improvement comprising:

means responsive to a desired acceleration of said compressor above a predetrmined rotational speed different than that produced by said fuel supply schedule and with said lever arrangement having moved said face to seal said second bleed orifice to terminate the establishment of fluid pressure Py for initiating communication of operational fluid to said first and second chambers having a further modified fluid pressure P_x', said bellow means responding to said further modified fluid pressure Px' by transmitting an operational signal to said metering valve whereby additional fuel is supplied to said combustion chamber according to a new fuel supply schedule corresponding to the actual speed of said turbine corrected for temperature and altitude.

5,072,579

MARINE VESSEL THRUSTER

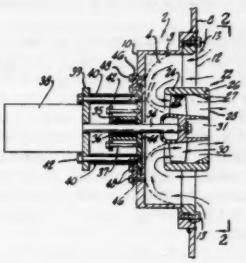
Calvin A. Gongwer, Glendora, Calif., assignor to Innerspace Corporation, Covina, Calif.

Filed Apr. 20, 1990, Ser. No. 511,414
Int. Cl.[5] B63H *1/14*
U.S. Cl. 60—221 **20 Claims**

1. A wall thruster for a marine vessel comprising:

(a) a housing having a substantially cylindrical plenum chamber therein and a circular cover at a forward end thereof, the cover having a plurality of inlet openings surrounding a central outlet opening wherein the outlet opening is circular; and

(b) an impeller disposed within the housing such that the impeller, when rotated, can draw water into the plenum chamber through the inlet openings and discharge it out through the outlet opening to create a thrust wherein the flow area through the impeller is greater than the flow



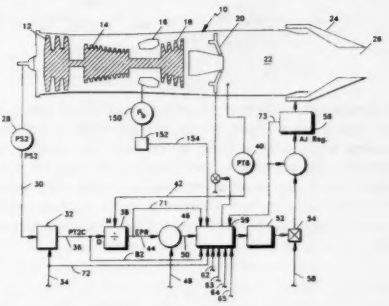
area through the outlet opening so as to reduce cavitation during operation of the thruster.

5,072,580

SYSTEM FOR OPERATING GAS TURBINE JET ENGINE WITH FAN DAMAGE

Gregory S. Patterson, Stuart, and James B. Kelly, Lake Worth, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 316,265, Feb. 27, 1989, Pat. No. 4,959,955.
This application Jul. 17, 1990, Ser. No. 553,466
Int. Cl.[5] F02K *1/18*
U.S. Cl. 60—242 **11 Claims**



1. A gas turbine engine having:

a compressor;

a turbine;

an augmentor;

a variable area exhaust nozzle;

a known anticipated EPR value for any operating airflow and nozzle area condition, representing an undamaged compressor;

EPR sensing means for sensing the actual EPR and producing an actual EPR signal;

nozzle position sensing means for determining nozzle area;

nozzle adjusting means for varying the nozzle area;

stall detecting means;

an EPR control mode comprising said nozzle adjusting means responsive to said EPR sensing means;

a base control mode comprising a fixed nozzle area operation mode;

characterized by:

EPR error calculation means for establishing a quantitative actual EPR error signal by comparing the actual EPR signal to said anticipated EPR value;

fan damage detect means defining a tolerable EPR fan damage error;

damage comparison means for comparing said actual EPR error signal to said tolerable EPR fan damage error of said

fan damage detect means and establishing a fan damage signal, if said EPR error signal exceeds said tolerable EPR fan damage error;

a stall detect means for detecting an immediately preceding stall;

fan damage accommodation means defining a predicted stall limit nozzle area as a function of potential EPR error signal, and including damage accommodation comparison means for applying said actual EPR error signal as said potential EPR error of said fan damage accommodation means and determining a corresponding nozzle area; and

minimum area limit means responsive to said damage accommodation means, or limiting the minimum area of said nozzle to said corresponding area, but only in the presence of a detected fan damage signal and an immediately preceeding stall.

5,072,581

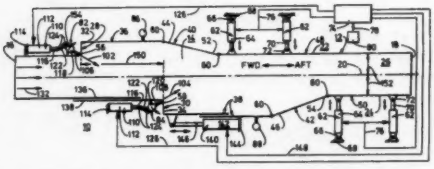
SCRAMJET COMBUSTOR

Daniel L. Harshman, Forest Park, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 327,831, Sep. 26, 1988. This application Oct. 15, 1990, Ser. No. 597,132

Int. Cl.[5] F02K *7/10, 7/14*

U.S. Cl. 60—270.1 **3 Claims**



3. A scramjet combustor having a longitudinal axis and two spaced-apart, generally opposing, and generally longitudinally extending walls, with at least one of said walls having an aft-facing step, said combustor also having a fuel injector disposed proximate said step at an acute positive angle with respect to said longitudinal axis, and wherein the improvement comprises means for varying said fuel injector angle during supersonic flight.

5,072,582

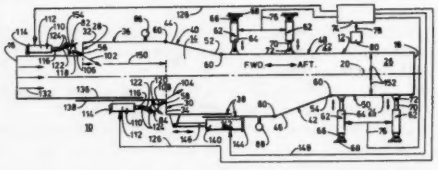
SCRAMJET COMBUSTOR

Daniel L. Harshman, Forest Park, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Mar. 23, 1989, Ser. No. 327,831

Int. Cl.[5] F02K *7/10, 7/14*

U.S. Cl. 60—270.1 **4 Claims**



4. A scramjet combustor having a longitudinal axis and two spaced-apart, generally opposing, and generally longitudinally extending walls, with each of said walls having an aft-facing step, said steps being a longitudinal distance apart, said combustor also having a fuel injector disposed proximate a said step at an acute positive angle with respect to said longitudinal axis, and wherein the improvement comprises:

(a) means for varying said longitudinal distance during supersonic flight;

(b) means for varying said fuel injector angle during supersonic flight; and

(c) means for varying the transverse distance between said walls during supersonic flight.

5,072,583

EXHAUST SYSTEM FOR INTERNAL COMBUSTION ENGINES

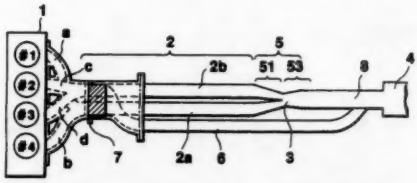
Tomonori Urushihara; Junichi Yokoyama, both of Kanagawa, and Teruyuki Itoh, Tokyo, all of Japan, assignors to Nisson Motor Company, Ltd., Japan

Filed Feb. 8, 1990, Ser. No. 476,792

Claims priority, application Japan, Feb. 8, 1989, 1-27601

Int. Cl.[5] F02B *27/02*

U.S. Cl. 60—313 **8 Claims**



1. An exhaust system for internal combustion engines comprising:

at least two exhaust passages, each passage communicated with at least one branch exhaust passage of an exhaust manifold communicating exhaust ports of a multiple-cylinder engine;

a confluent exhaust passage disposed downstream of said at least two exhaust passages, said confluent exhaust passage including a confluent point for converging downstream ends of said at least two exhaust passages; and

means for bypassing a portion of exhaust gas flow through said confluent point only when the engine is within a predetermined high engine revolution range.

5,072,584

HYDRAULIC DRIVE WITH FLUID COOLING BY-PASS LINE

Magnus Mauch, J.-Kerner-Str. 2, D-7320 Göppingen, and Achim L. Kehrberger, E.-Kirchner-Str. 33, D-7302 Ostfildern, both of Fed. Rep. of Germany

PCT No. PCT/EP88/00231, § 371 Date Sep. 7, 1989, § 102(e) Date Sep. 7, 1989, PCT Pub. No. WO88/07633, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 22, 1988, Ser. No. 399,488

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710028

Int. Cl.[5] F16D *31/02;* **F15B** *11/08*

U.S. Cl. 60—378 **8 Claims**

1. A pressure medium-operated driving device which includes

(a) a pump **(26)** having an outlet which supplies pressurized working fluid,

(b) a double-acting working cylinder **(10)** having working chambers **(16, 18)**,

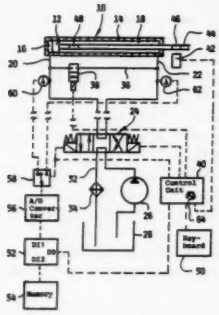
(c) a reversing valve **(24)**,

(d) a sump **(28)**,

(e) lines **(20, 32, 22, 30)** connecting the working chambers **(16, 18)** of the double-acting cylinder **(10)** with the reversing valve **(24)** and the outlet of said sump **(26)**, the volume of said lines at least equalling the volume of a working chamber **(16, 18)** of the double-acting working cylinder **(10)**,

(f) a cooling device (34) associated with at least one of said connecting lines (20, 32; 22, 30),

(g) a valve controlled bypass line (36, 38) interconnecting



end portions of said connecting lines (20, 32; 22, 30) adjacent to the double-acting working cylinder (10), and

(h) a scavenging control (40) to open and close said valve controlled bypass line (36, 38).

5,072,585

HYDROSTATIC AUXILIARY-POWER STEERING DEVICE

Rolf Fassbender, Mutlangen, and Bernd Ilg, Heuchlingen, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen, AG, Friedrichshafen, Fed. Rep. of Germany

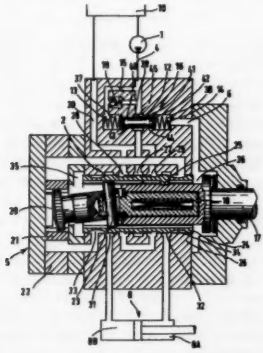
PCT No. PCT/EP89/00040, § 371 Date May 31, 1990, § 102(e) Date May 31, 1990, PCT Pub. No. WO89/06618, PCT Pub. Date Jul. 27, 1989

PCT Filed Jan. 14, 1988, Ser. No. 499,267

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801452

Int. Cl.[5] F16D *31/02*

U.S. Cl. 60—384 **10 Claims**



1. In a hydrostatic auxiliary-power steering device including a power-steering pump for delivering a flow of pressure oil to an intake conduit, a steering motor connected with the intake conduit by a steering valve that is adjustable by rotation of a steering wheel and a metering pump that is driven by rotation of the steering wheel, and a branch conduit leading to the metering pump and connected with the intake conduit,

the improvement which comprises

a damping valve (16) arranged in said intake conduit (4), said damping valve including

(a) a piston (12) shiftable between a neutral middle position and operating positions; and

(b) spring means (13, 14) for biasing said piston toward its neutral position, said piston blocking the branch conduit (6) when in the neutral position and opening a flow cross-section from the intake conduit to the branch conduit of the metering pump (5) when in an operating position.

5,072,586

HYDROSTATIC SERVO-ASSISTED STEERING SYSTEM, PARTICULARLY FOR MOTOR VEHICLES

Rolf Fassbender, Mutlangen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany

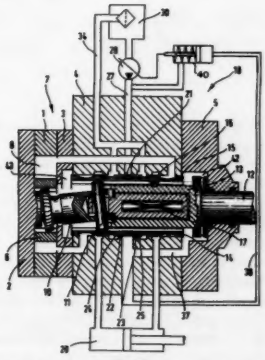
PCT No. PCT/EP88/01034, § 371 Date Apr. 18, 1990, § 102(e) Date Apr. 18, 1990, PCT Pub. No. WO89/04788, PCT Pub. Date Jun. 2, 1989

PCT Filed Nov. 12, 1988, Ser. No. 469,575

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740120

Int. Cl.[5] F16D *31/02*

U.S. Cl. 60—384 **5 Claims**



1. In a hydrostatic auxiliary power steering mechanism for motor vehicles including a metering device operated by a manual steering wheel, a control valve connected with the metering device and shifted from a neutral middle position in first and second opposite axial directions against the force of spring elements upon rotation of the steering wheel in opposite directions, respectively, a variable displacement pump having a pressure line connected with the control valve and a nonreturn line connected with a pressure medium reservoir, the pressure line containing an orifice and a control line beyond the orifice in the direction of flow, said control line being connected with an adjusting device for the variable displacement pump, the control line being connected with the nonreturn line when the control valve is in its neutral middle position, the control valve including a valve piston arranged in a valve borehole connected with the pressure line via a discharge opening thereof, the valve piston having an outer surface including a central spool land adjacent to the pressure line discharge opening and two spool lands spaced on either side of the central land to define a pair of grooves, the improvement which comprises

(a) a segment of each of said pressure and control lines is connected with said valve borehole via a common opening arranged adjacent said piston central spool land; and

(b) said orifice being defined by said piston central spool land and said pressure line discharge opening, said orifice having a cross-section that varies as a function of the position of said control valve, said orifice having a minimum cross-section when said control valve is in its neutral middle position, said orifice cross-section increasing as

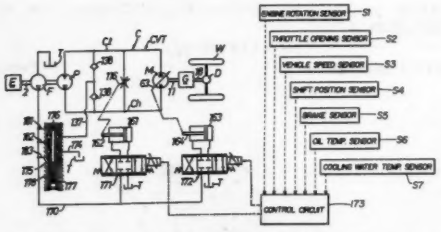
said control valve is shifted in opposite directions upon rotation of the steering wheel.

5,072,587

HYDRAULICALLY OPERATED CONTINUOUSLY VARIABLE TRANSMISSION

Kenichi Ikejiri; Eiichiro Kawahara, and Mitsumasa Furumoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 130,750, Dec. 9, 1987, Pat. No. 4,864,823. This application Aug. 15, 1989, Ser. No. 394,215
Claims priority, application Japan, Dec. 9, 1986, 61-293068
The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.
Int. Cl.[5] F16D *39/00*
U.S. Cl. 60—488 **17 Claims**



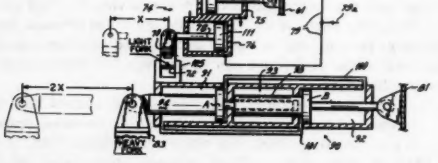
1. An oil flow control apparatus in a hydraulically operated continuously variable transmission, comprising a hydraulic actuator, an auxiliary pump supplying an operating oil under pressure to said hydraulic actuator, a valve for maintaining a relatively constant pressure of said operating oil at said hydraulic actuator, an oil passage connected to said auxiliary pump, said hydraulic actuator, and said valve, a release oil passage connected to said valve, and a replenishing oil passage connected to said valve for supplying replenishing oil to said hydraulic transmission, wherein said valve selectively connects said auxiliary pump to said replenishing oil passage according to the pressure of oil supplied from said auxiliary pump and to said release oil passage according to the pressure of oil supplied from said auxiliary pump.

5,072,588

MOTION MULTIPLIER FOR USE WITH EXTENDABLE BOOM FORK LIFT VEHICLE

James E. Lowder; Ronald R. Shinn, and John L. Baker, all of Lubbock, Tex., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Division of Ser. No. 394,889, Aug. 17, 1989, Pat. No. 4,986,721. This application May 23, 1990, Ser. No. 527,347
Int. Cl.[5] F15B *3/00*
U.S. Cl. 60—571 **1 Claim**



1. A motion multiplier comprising:

a moving cylinder having a central chamber and a first outboard chamber on one side of said central chamber and a second outboard chamber on the other side of said central chamber, said outboard chambers having inner ends adjacent said central chamber and outer ends spaced from said central chamber,

a fixed piston in said first outboard chamber and a movable piston in said second outboard chamber,

a fixed piston rod connected to said fixed piston and projecting from one end of said cylinder,

a moving piston rod connected to said moving piston and projecting from the other end of said cylinder,

a first fluid line interconnecting said inner end of said first outboard chamber to said outer end of said second outboard chamber,

a second fluid line interconnecting said outer end of said first outboard chamber is said inner end of said second outboard chamber,

said outboard chambers and lines being filled with fluid, and means for moving said cylinder axially,

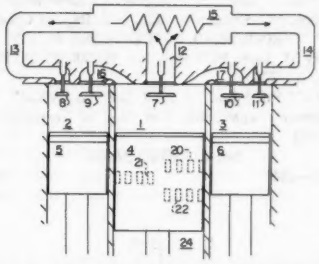
whereby, when one rod is fixed and said cylinder is moved with respect to it, the movable rod will move a greater distance which is equal to the distance said cylinder moves plus the distance said movable rod travels with respect to said cylinder.

5,072,589

INTERNAL COMBUSTION ENGINE HAVING MULTIPLE EXPANSION AND COMPRESSION

Gerhard Schmitz, Silvio-Gsell-Strasse 19, B-4780 Saint-Vith, Belgium

Filed Dec. 7, 1989, Ser. No. 447,268
Claims priority, application Belgium, Dec. 30, 1988, 8801451
Int. Cl.[5] F02B *33/06*
U.S. Cl. 60—622 **7 Claims**



2. An internal combustion engine of the type comprising a plurality of at least three cylinders each including a working chamber with a volume variable through the displacement within the cylinder of a piston between a top dead center position and a bottom dead center position under the effect of pressure forces periodically generated within said chamber, to each cylinder being associated gaseous fluid intake means and combustive gas discharge means, the piston of each cylinder being connected to a crankshaft of the engine, wherein at least one cylinder operating as a two-stroke low pressure cylinder and two cylinders operating as combustive cylinders and in that the pistons of the low pressure and combustive cylinders, respectively, are connected to the crankshaft so that the pistons of the combustive cylinders on the one hand and the piston of the low pressure cylinder on the other hand are moving in opposite directions, the working chamber of the low pressure cylinder communicating with a gaseous fluid intake way and with a combustible gases exhaust way and with the working chamber of each combustive cylinder on the one hand through a first channel comprising heat exchange means for discharging the fluid into this working chamber, through the agency of a discharge valve associated with the low pressure cylinder and of an inlet valve associated with the combustive cylinder and on the other through a second channel separate from said first channel for transferring the combustible gases through the medium of a transfer valve associated with the combustive cylinder, said valves being operated so that said

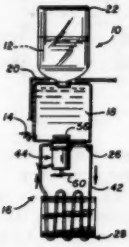
discharge valve be open during the stroke of the piston of the low pressure cylinder towards its top dead center simultaneously with the inlet valve of one of the two combustive cylinders and in that the transfer valve of this combustive cylinder is open during the second stroke of the piston of the low pressure cylinder towards its bottom dead center after the intake of the fluid into this cylinder.

5,072,590

BOTTLED WATER CHILLING SYSTEM

Bruce D. Burrows, Valencia, Calif., assignor to Ebtech, Inc., Columbus, Ohio

Filed Feb. 11, 1991, Ser. No. 653,054
Int. Cl.[5] F25B *21/02*
U.S. Cl. 62—3.64 **11 Claims**



6. A water dispenser station, comprising:

a housing defining a storage reservoir adapted to receive a supply of water;

a thermoelectric heat transfer module having a hot side and cold side, and means for transferring thermal energy from said cold side to said hot side;

means for mounting said module with said cold side in thermal communication with the water supply within the storage reservoir;

a heat exchanger;

a closed loop circulation network connected between said heat exchanger and module hot side;

a heat transfer fluid within said circulation network; and

pump means for circulating the heat transfer fluid through said closed loop circulation network, said pump means including a drive motor having a drive shaft, a first impeller driven by said drive shaft for circulating the heat transfer fluid through said circulation network, and a second impeller driven by said drive shaft for stirring water within the reservoir.

5,072,591

FLEXIBLE TRANSFER LINE EXHAUST GAS SHIELD

John A. Grange, Red Hook, and Sadeg M. Faris, Pleasantville, both of N.Y., assignors to HYPRES Incorporated, Elmsford, N.Y.

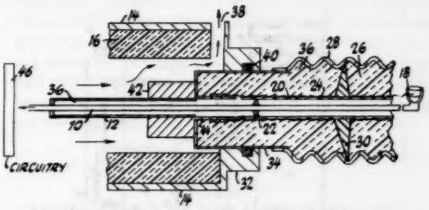
Filed Oct. 17, 1989, Ser. No. 422,759
Int. Cl.[5] F17C *13/00*
U.S. Cl. 62—50.7 **17 Claims**

1. A flexible transfer line for transferring cooling liquid between a first and a second point, comprising:

a delivery capillary coupled to a supply of said liquid;

an outer flexible support coaxial with said delivery capillary;

an inner flexible shield positioned between said outer flexible support and said delivery capillary to provided thermal isolation of said delivery capillary from the ambient, with



the shield having a low-thermal conductivity means disposed at its inside surface; and

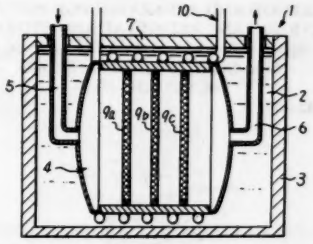
means for removing heat from said shield.

5,072,592

GAS CLEANER

Tsuneo Ishigaki, Soka, Japan, assignor to SMC Corporation, Tokyo, Japan

Filed Jun. 26, 1990, Ser. No. 543,479
Int. Cl.[5] B01D *8/00*
U.S. Cl. 62—55.5 **10 Claims**



1. A gas cleaner comprising a heat-insulating coolant container to be filled with a coolant and a hermetically sealed container of a thermally conductive material immersed in the coolant in said coolant container,

the hermetically sealed container having a pipe to supply a gas to be cleaned, a pipe to discharge a cleaned gas, and filters of sintered metal to remove moisture from the cooled gas flowing through the container from the supply pipe to the discharge pipe by means of liquefaction and adsorption, and

the filters being made of a sintered metal prepared by sintering fine particles or fibers of a thermally conductive metal and closely and directly fitted to the inner wall of the hermetically sealed container.

5,072,593

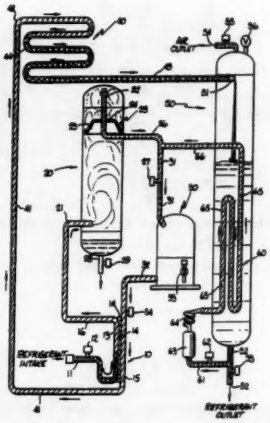
REFRIGERANT RECLAIM METHOD AND APPARATUS

Leon R. Van Steenburgh, Jr., 850 E. Lane Devils Gulch Rte., Estes Park, Colo. 80517

Continuation of Ser. No. 294,823, Jan. 9, 1989, abandoned, which is a division of Ser. No. 109,958, Oct. 19, 1987, abandoned. This application Aug. 17, 1990, Ser. No. 569,229
Int. Cl.[5] F25B *45/00*
U.S. Cl. 62—77 **9 Claims**

1. A method for reclaiming refrigerant comprising, drawing refrigerant to be reclaimed from its container, heating the

refrigerant to a gaseous state, expanding the gaseous stream in an upwardly flowing path, separating oil from the gaseous



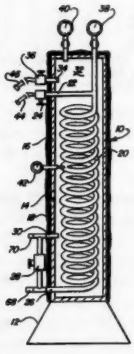
stream by abruptly interrupting the flow of the stream and thereby separating oil from it by gravity.

5,072,594

METHOD AND APPARATUS FOR PASSIVE REFRIGERANT RETRIEVAL AND STORAGE

David C. Squire, 1603 Chestnut, Port Huron, Mich. 48060

Filed Oct. 5, 1990, Ser. No. 593,689
Int. Cl.[5] F25B *45/00*
U.S. Cl. 62—77 **16 Claims**



15. A method of retrieving and storing refrigerant from a cooling system being serviced of the type having a compressor for circulating a compressible refrigerant in a closed, pressurized system between a condenser and an evaporator to provide a cooling effect, the method comprising the steps of:

connecting one end of a refrigerant collector tube contained within a housing to the cooling system at the condenser outlet;

connecting the interior of said housing to the compressor inlet;

operating the cooling system compressor to pressurize refrigerant in the cooling system and pump the refrigerant into said collector tube; and

discharging refrigerant from said collector tube into said housing interior through a metering valve where the refrigerant pressure is reduced and evaporates and cools the refrigerant remaining in said tube and the evaporated refrigerant is drawn into said compressor inlet

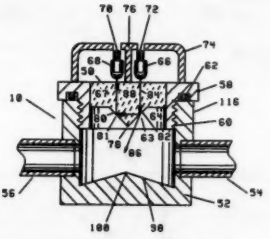
whereby said refrigerant becomes trapped within said housing.

5,072,595

APPARATUS FOR DETECTING SMALL BUBBLES IN A PRESSURIZED FLUID STREAM

William J. Barbier, 6720 Christina Marie La., Hazelwood, Mo. 63042

Filed Sep. 19, 1990, Ser. No. 584,696
Int. Cl.[5] G01N *53/00*
U.S. Cl. 62—129 **12 Claims**



1. Apparatus for detecting gas bubbles in a liquid stream flowing within a conduit comprising

inlet connection means for connecting to the conduit,

chamber means communicating with the inlet connection means and positioned above it for containing liquid and for receiving and accumulating gas bubbles conveyed to it by the liquid stream whereby the liquid is displaced by the accumulated gas bubbles, the chamber means including a wall for containing and preventing escape to the atmosphere of its liquid and gas contents,

window means positioned in the wall for permitting light to enter and leave the chamber means, an exterior surface, and an interior surface subject to the liquid or gas contents of the chamber means,

a point on the interior surface positioned at a height above the inlet connection means,

an imaginary line erected in the window means, the line being perpendicular to the interior surface at the point,

light source means positioned adjacent the exterior surface of the window means in a first position for directing a light beam in a path which intersects the point at an angle with the perpendicular line, the angle being selected to produce a condition of transmission with refraction on the presence of liquid in the chamber means, and a condition of total internal reflection on the presence of gas in the chamber means and

light sensor means positioned adjacent the exterior surface of the window means in a second position for receiving light emanated from the light source means and reflected from the point, and further including

means activated by the light sensor for performing a first function on the presence of liquid adjacent the window interior surface and for performing a second function on the presence of gas adjacent the window interior surface, and further including

a refrigerating system having multiple evaporators and a reverse cycle hot gas defrost system for defrosting at least one evaporator, said hot gas defrosting evaporator having a suction outlet and having also a liquid inlet with a conduit connected thereto and the bubble detecting apparatus connected therein, a conduit for providing hot gas to the suction outlet during defrost and further providing that the second function is the termination of the defrost.

5,072,596

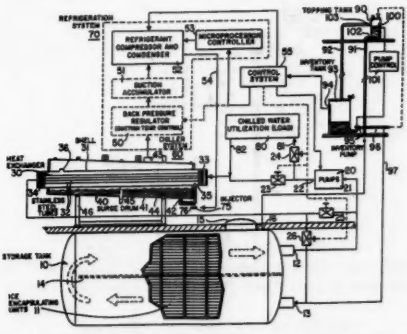
ICE BUILDING CHILLED WATER SYSTEM AND METHOD

Thomas A. Gilbertson, Moraga; Michael R. Meyers, Sonoma, and Bruce Kinneberg, Martinez, all of Calif., assignors to Reaction Thermal Systems, Inc., Napa, Calif.

Continuation-in-part of Ser. No. 311,215, Feb. 14, 1989, Pat. No. 4,928,493, which is a continuation-in-part of Ser. No. 284,890, Dec. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 11,617, Feb. 6, 1987, abandoned. This application Mar. 12, 1990, Ser. No. 493,128

Int. Cl.[5] F25D *17/02*

U.S. Cl. 62—185 2 Claims



1. In a chilled water system, comprising, in combination:

structural means defining a vessel for containing a volume of a first liquid characterized by a first freezing temperature substantially lower than water;

a multiplicity of ice encapsulating units disposed in said vessel and occupying a major portion of the volume thereof, each of said ice encapsulating units comprising sealed container means being filled with water and having a volume of cholesterol therein serving as ice nucleating agent for said water; and

a liquid chilling system operatively associated with said vessel for cooling said first liquid in said vessel to a temperature above said first freezing temperature and below the freezing temperature of water;

said system adapted for use with a chilled liquid utilization system having a predetermined highest point of liquid utilization, said liquid chilling system being operative during an ice building cycle, and further comprising pumping means operative during an ice thawing cycle for circulating said first liquid through said chilled liquid utilization system and said structural means; and

wherein said structural means comprises a first vessel in the form of a closed tank, a second separate vessel mounted at a location higher than said first vessel with a pipe connecting said second vessel to said first vessel for automatic flow of portions of said first liquid from said first vessel to said second vessel due to volume expansion of said ice encapsulating units during said ice building cycle and for automatic flow of portions of said first liquid from said second vessel to said first vessel due to volume contraction of said ice encapsulating units during said ice thawing cycle, and a third vessel with an overflow pipe connecting said second vessel to said third vessel for communicating overflow of volumes of said first liquid therebetween during said ice building cycle, the total volume of portions of said first liquid flowing from said first vessel to said second vessel during said ice building cycle having a predetermined maximum liquid displacement value, said second vessel having a second vessel volume value comprising a preselected fraction of said maximum liquid displacement value and being adapted to be mounted in a location higher than said highest point of liquid utilization; said third vessel having a third vessel volume value at least equal to the difference between said second volume value and said maximum liquid displacement value, overflow pipe means coupling said second vessel to said third vessel for communicating overflow volumes of said first liquid therebetween during said ice building cycle, level detecting means disposed in said second vessel for signalling when said first liquid therein falls below a preset level, and pumping means operated in response to said level detecting means for pumping a volume of said first liquid from said third vessel to said second vessel to maintain a preset level of said first liquid in said second vessel during said ice thawing cycle.

5,072,597

CONTROL SYSTEMS FOR AUTOMOTIVE AIR CONDITIONING SYSTEMS

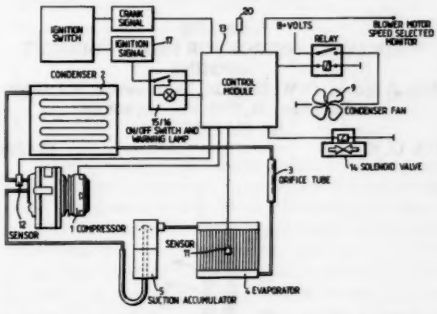
Patrick J. Bromley, Solihull, and Grenville G. H. Luxton, Birmingham, both of United Kingdom, assignors to Motor Panels (Coventry) Ltd., Coventry, England

Filed Apr. 13, 1990, Ser. No. 508,703

Claims priority, application United Kingdom, Apr. 13, 1989, 8908338

Int. Cl.[5] F25B *41/00*

U.S. Cl. 62—209 15 Claims



1. A control system for an automotive air conditioning system which includes a refrigeration circuit comprising a refrigerant compressor, an electromechanical clutch for controlling an operation of the compressor, a condensor, a refrigerant expansion means and an evaporator having an evaporator core surface, the control system comprising means for sensing temperatures at the evaporator and at the compressor of the air conditioning system and a controller responsive to signals from the sensing means to control cycling of the compressor clutch, wherein the controller is operative to monitor the cycle rate of the compressor clutch and to provide command signals, to control the operation of the air conditioning system in providing conditioned air, when the clutch cycle rate exceeds or falls below predetermined values.

5,072,598

SCARF FOR TRANSFERRING HEAT FROM OR TO BODY AREAS OF THE WEARER

Carroll M. Dibrell, San Antonio, Tex., assignor to Exer Icer Towels, Inc., San Antonio, Tex.

Filed Aug. 13, 1990, Ser. No. 565,786

Int. Cl.[5] F25D *23/12*

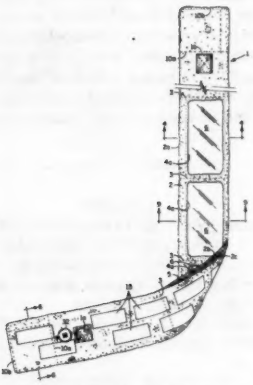
U.S. Cl. 62—259.3 22 Claims

9. A scarf for absorbing heat from, or transmitting heat to a body area of the wearer comprising:

an elongated band of flexible fabric wrappable around a body area of a wearer;

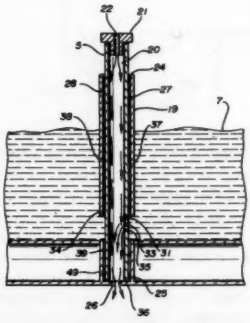
means on the medial portion of said fabric band defining a pocket for receiving a heat absorbing or emitting mass;

said pocket having an inner wall adjacent the body areas of the wearer; and



said inner wall being formed of a thin gauge sheet of heat transfer material.

5,072,599
AIR TUBE CONTROL FOR FROZEN DESSERT MACHINE
John J. Simone, 69 W. Long Dr., Lawrenceville, N.J. 08648
Filed Mar. 13, 1991, Ser. No. 668,940
Int. Cl.[5] F25C *1/20*
U.S. Cl. 62—308 **18 Claims**

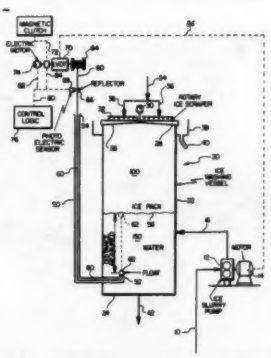


1. In an apparatus for dispensing frozen confectionery products, including a freeze chamber, a liquid product reservoir and a flow channel connecting the freeze chamber with the reservoir, an improved flow device for controlling the flow of air and liquid into the freezing chamber from the liquid product reservoir; the device comprising:

a) a tubular member having an upper and lower section with a longitudinal air passageway therethrough, said lower section being positioned within said flow channel submersed within said liquid product reservoir, and said upper section extending above the liquid held within said liquid product reservoir, said tubular member having at least one opening formed within the circumferential skin of said lower section, said opening allowing liquid to flow from said liquid product reservoir into said longitudinal air passageway;

b) a tubular sleeve having two open ends, a top end and a bottom end, said sleeve fitting around and being movably positionable along said tubular member, said sleeve being capable of covering said openings on said lower section of said tubular member, blocking the flow of liquid from said liquid product reservoir into said longitudinal air passageway.

5,072,600
WASH COLUMN ICE-PACK BOTTOM DETECTION DEVICE
Arif Y. Kiziltug, Naperville, Ill., assignor to Chicago Bridge & Iron Technical Services, Oak Brook, Ill.
Filed Dec. 4, 1990, Ser. No. 622,006
Int. Cl.[5] B01D *9/04;* **G01F** *23/30*
U.S. Cl. 62—540 **15 Claims**



1. Apparatus comprising:

a vessel containing a variable amount of an aqueous ice slurry as an upper packed ice bed floating on an aqueous volume;

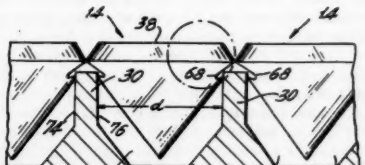
the vessel having a lower internal space;

a hollow conduit having a first end located in the lower internal space of the vessel and a second end located exterior of the vessel;

a float positioned in the vessel lower internal space; and

a movable line in the hollow conduit and extending out of the first end and joined to the float, and the line extending out of the conduit second end thus permitting it to be displaced to indicate the position of the float, and thus the bottom of the packed ice bed, when it contacts the packed ice bed bottom.

5,072,601
DIAMOND SETTING
Christopher Slowinski, 246-16 81st Ave., Bellerose, N.Y. 11426
Filed Sep. 18, 1990, Ser. No. 584,194
Int. Cl.[5] A44C *17/02*
U.S. Cl. 63—28 **17 Claims**



7. A jewelry piece, comprising:

a plurality of precious stones;

a setting, and means for mounting said stones in said setting of said jewelry piece;

each of the stones comprising

a visible upper surface and a body extending below the upper surface and having at least two opposed facets;

said means for mounting said stones comprising a respective cutout in each of the opposed facets, each cutout defining in the body a respective biting edge and a clearance above the biting edge;

a plurality of parallel, spaced walls in said setting, said walls having flat surfaces in the region thereof which is traversed and engaged by said biting edges; and

said walls having a distance therebetween which is just slightly smaller than a corresponding distance between said biting edges in a manner enabling said biting edges to bite into and firmly grip opposed ones of said walls of the setting.

5,072,602

WEFT THREAD TRANSPORTER

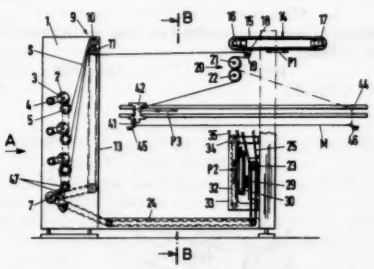
Rolf Naumann, Muhleim/Mein, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 451,758

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 3842870

Int. Cl.[5] D04B *23/00*

U.S. Cl. 66—84 A **21 Claims**



1. A weft thread transporter for a continuous, oscillating weft magazine in a wrap knitting machine driven by a main shaft, said machine having a pair of parallel weft carriers and consuming weft threads from a creel, said transporter being adapted to work with the weft threads when they are either elastic or non-elastic, comprising:

a carriage having thread guides for laying the weft threads across the parallel weft carriers with a cyclically varying laying speed depending upon the position of the carriage, said carriage being operable to lay the weft threads by reciprocating between the parallel weft carriers of the magazine;

a first driven delivery means for providing the weft threads from said creel at a substantially constant delivery speed;

a second driven delivery means downstream from said first delivery means for delivering therefrom said weft threads at a variable thread drive speed that corresponds to the cyclically varying laying speed; and

a storage means located between said first and second delivery means for compensating for the difference between the constant delivery speed and the variable thread drive speed.

5,072,603

KNITTING MACHINE WITH NEEDLE CONTROL DEVICE FOR THE KNITTING OF PATTERN STITCHES

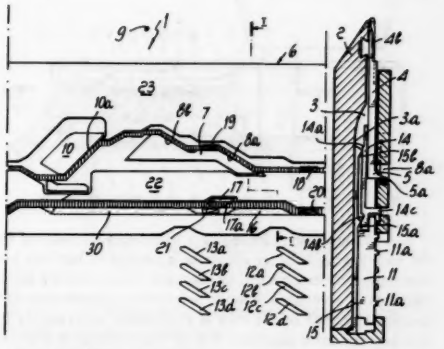
Riccardo Tenconi, Varese, Italy, assignor to Mec-Mor S.r.l., Induno Olona, Italy

Filed Jul. 5, 1990, Ser. No. 548,338

Claims priority, application Italy, Jul. 10, 1989, 21141 A/89

Int. Cl.[5] D04B *15/66*

U.S. Cl. 66—222 **6 Claims**



1. Knitting machine, with needle control device for knitting pattern stitches, comprising a needle holder element having a plurality of grooves each of which slidably accommodates at least one needle and a selector arranged facing, with one longitudinal end, the base of said needle, each said at least one needle being provided with at least one heel protruding from the related groove of the needle holder element and being engageable in paths defined by cams arranged facing said needle holder element for the actuation of said needles with a reciprocating longitudinal movement along said grooves for forming knitting, each of said needles being oscillable in a plane substantially parallel to the sides of the related groove for the passage of a heel of the needle from a position where the needle is sunk in said groove to an extracted position where the needle protrudes from said groove, comprising an extraction element arranged in each of said grooves between the selector and the related needle and being controllably movable from an inoperative position, said extracting element does not interfere with the position of said needle, to an operative position, the extraction element defines a rest for the side of said needle opposite with respect to the heel of the needle to keep said heel in the extraction position,

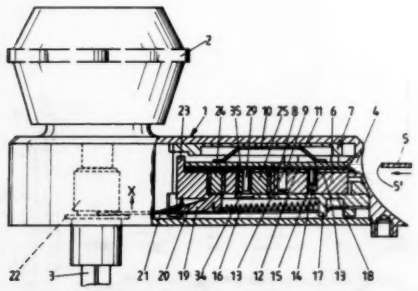
wherein said extraction element is substantially constituted by a shaped plate arranged between the side of the needle opposite to the heel and the bottom of the groove, said plate having at least one portion having the shape of an inclined plane and is associable with at least one correspondingly shaped portion provided on the bottom of said groove, said plate being controllably movable from said inoperative position to said operative position along a direction substantially parallel to the longitudinal extension of the needle for the movement of said plate away from the bottom of said groove upon the coupling of said inclined portions and,

wherein said inclined portion provided on the bottom of said groove is defined on a rod blocked on the bottom of said groove.

5,072,604
CLOSURE SYSTEM CONSISTING OF A LOCK AND A PLURALITY OF KEYS

Armin Eisermann, Velbert, Fed. Rep. of Germany, assignor to Schulte-Schlagbaum Aktiengesellschaft, Velbert, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 234,813
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728073; Dec. 17, 1987, 3742826
Int. Cl.[5] E05B *25/00, 47/00*
U.S. Cl. 70—276 **23 Claims**



1. A closure system including a lock and a plurality of keys, the lock having tumbler elements, a closure of the lock being determined by mechanical or magnetic control of the tumbler elements in a variable manner, wherein a closure code of the tumbler elements of the lock is established successively by a first key and each successor key of a succession of a plurality of keys, the closure code corresponding initially to a coding of said first key of the plurality of keys and is variable by a shifting of at least one tumbler element within the lock to the coding of a next successor key of the plurality of keys; and wherein

each successor key is divided into a first region which cooperates exclusively with the closure code of the tumbler elements and a second, supplementation region, which enters into action when the first region agrees with the closure code of the tumbler elements, said first and said second regions of each successor key allowing for displacement of the tumbler elements upon insertion of a corresponding successor key into the lock; and

said supplementation region shifts the tumbler element into the position actuated by the supplementation region of the next successor key of said plurality of keys; and

wherein said lock further comprises a plurality of carriers, individual ones of said tumbler elements being carried by respective ones of said carriers, each of said carriers being rotatable about an axis, a tumbler element being displaceable in its carrier in a direction parallel to the axis of the carrier.

5,072,605
PROCESS FOR PRODUCTION OF COVERED DEEP-DRAWN CAN

Katsuhiro Imazu; Masanori Aizawa, both of Yokohama; Tetsuo Miyazawa, Ayase; Nobuyuki Satoh, Ebina, and Seishichi Kobayashi, Yokohama, all of Japan, assignors to Toyo Seikan Kaisha Ltd., Tokyo, Japan

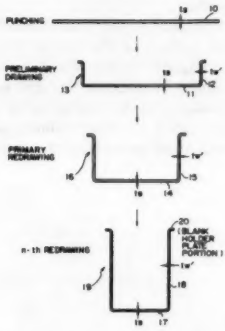
Filed Jun. 13, 1990, Ser. No. 538,044
Claims priority, application Japan, Jun. 13, 1989, 1-148285
Int. Cl.[5] B21B *45/00*
U.S. Cl. 72—46 **12 Claims**

1. A process for the production of a covered deep-drawn can, which comprises

covering a metal sheet with a thermoplastic resin and

subjecting the covered metal sheet to drawing and deep drawing to form a covered deep-drawn cup having a blank portion integrated therewith, and

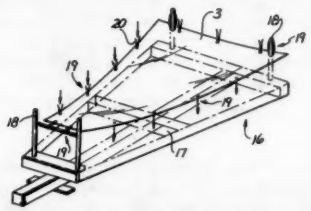
heat treating the formed covered deep-drawn cup at a temperature higher than the glass transition point of the thermoplastic resin covering but lower than the melting point of the thermoplastic resin covering in a state wherein said blank holder plate portion formed by the deep-drawing is heat treated as an integral part of said cup.



5,072,606
PEENING SHOT CURVING

Winfried Koehler, Hagnau; Klaus-Peter Hornauer, Aachen; Reiner Kopp, Aachen; Klaus Baldner, Aachen, and Frank Wuestefeld, Aachen, all of Fed. Rep. of Germany, assignors to Dornier GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed Dec. 13, 1989, Ser. No. 450,271
Claims priority, application Fed. Rep. of Germany, Dec. 14, 1988, 3842064
Int. Cl.[5] B21J *5/00;* **C21D** *7/06*
U.S. Cl. 72—53 **5 Claims**



1. Method of shaping planar parts which have an elastic and plastic range for making components which are curved two dimensionally around two axes and in the same direction to have a concave and a convex side, under utilization of a high pressure beam of peening shot comprsing the steps of;

tensioning and positioning a part to obtain initially and through deformation, the desired contour;

shot peening a surface of that part from the concave side with peening shot by running at least one shot beam along track lines which are essentially lines of equal strain in the part to be made to begin obtaining plastic deformation on the part;

controlling the peening shot beam energy such that more central parts receive shot at a higher kinetic energy than more peripheral parts of said part;

shot peening the convex side of the part so that a plastic deformation of the part is obtained; and

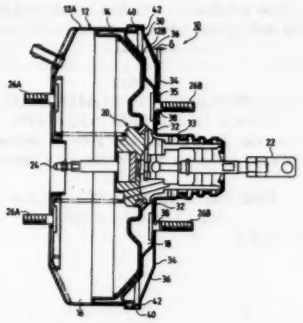
the part having thick edge parts, separately peening shot treating at least some of the thick edge parts.

5,072,607

BRAKE BOOSTER-MOUNTING INSTRUCTION

Kiyokazu Kaneko, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1991, Ser. No. 654,024
Claims priority, application Japan, Feb. 13, 1990, 2-31968
Int. Cl.[5] F01B *29/00*; F15B *9/15*
U.S. Cl. 92—161 2 Claims



1. A brake booster-mounting construction comprising:

stud bolts extending outwardly from a shell of the brake booster; and

a reinforcement plate adapted to be fastened, jointly with said shell, to a fixing member of a vehicle body by said stud bolts; wherein

in its non-mounted condition, said reinforcement plate is abutted against an outer peripheral portion of said shell, and also that portion of said reinforcement plate to be jointly fastened by said stud bolts is spaced from said shell; and

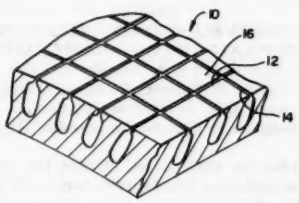
in its mounted condition, said reinforcement plate spring-urges the brake booster in a direction away from said fixing member.

5,072,608

REDUCTION OF TRANSIENT THERMAL STRESSES IN MACHINE COMPONENTS

Jerzy A. Lorett, Beaumaris, Australia, assignor to BW/IP International, Inc., Long Beach, Calif.

Division of Ser. No. 394,115, Aug. 15, 1989, Pat. No. 4,997,361.
This application Jul. 13, 1990, Ser. No. 552,075
Int. Cl.[5] B21D *53/10*
U.S. Cl. 72—364 2 Claims



1. A method for producing a component for use in mechanisms wherein the component is used to protect another component in the mechanism from thermal stresses, comprising:

providing a component for use in a mechanism;

machining a plurality of open-ended slots in said component, said slots intersecting a surface of the component;

closing the open ends of said slots by metal working techniques while retaining cavities beneath the surface;

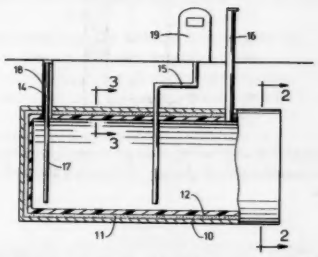
rapidly heating the component to a elevated temperature in excess of the temperature differential to which the component surfaces will be exposed during use to thereby cause the slots to slightly open, permitting said component to be subjected to sudden temperature variations during use without thermal stresses therein.

5,072,609

STORAGE TANK SYSTEMS HAVING IN SITU FORMED INNER TANK

Bruce R. Sharp, 7685 Fields-Ertel Rd., Cincinnati, Ohio 45241

Filed May 2, 1990, Ser. No. 518,108
The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.
Int. Cl.[5] G01M *3/32*
U.S. Cl. 73—49.2 11 Claims



1. A storage tank system for liquids having secondary containment capability, comprising:

(a) a rigid outer tank shell;

(b) a separating material having a thickness ranging from about 0.025 inches to about 2.0 inches covering the interior surface of the rigid outer tank shell; and

(c) an in situ formed inner tank made of a fibrous reinforced resinous material which is encased by the rigid outer tank shell with a closed space therebetween occupied by the separating material, further said inner tank characterized in not being rigidly connected to the rigid outer tank shell because of the separating material.

5,072,610

DEVICE FOR MEASURING THE MODIFICATION TIME OF THE PHYSICAL STATE OF A FLUID MEDIUM

Jean-Luc Martinoli, Villeneuve La Garenne; Alain Rousseau, Paris, and Pascal Vilain, Hadancourt le Haut Clocher, all of France, assignors to Servio, France

Continuation of Ser. No. 291,824, Dec. 29, 1988, abandoned.
This application Mar. 27, 1991, Ser. No. 679,124
Claims priority, application France, Dec. 30, 1987, 87 18347
Int. Cl.[5] G01N *21/82, 27/83*
U.S. Cl. 73—64.1 5 Claims

1. A device for measuring the time of change of the physical state of a fluid sample comprising:

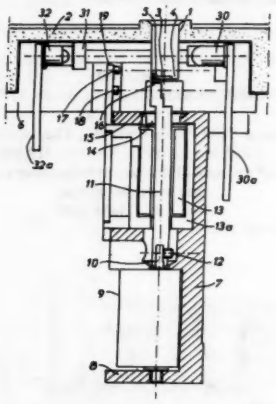
a container for holding the fluid sample;

a ferromagnetic member positioned and arranged so as to be movable in the bottom of the container along a predetermined circular path;

a driving means for generating a periodic rotating magnetic field to said ferromagnetic member which imparts to said member a sustained circular motion along said path; and

a detecting means for detecting the variations of frequency of said circular motion of said ferromagnetic member during the time of change in the physical state of the fluid sample, said detecting means further comprising means for measuring the relative speed of said sustained circular motion of said ferromagnetic member and the relative

speed of said periodic rotating magnetic field during the time of change of the physical state of the sample fluid,



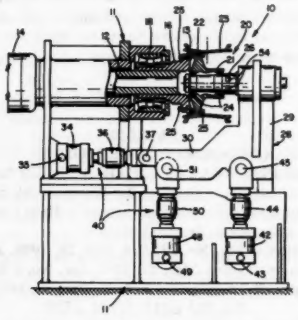
and means for comparing said measured relative speeds to provide the time of change of physical state of the sample fluid.

5,072,611

APPARATUS AND METHOD FOR TESTING WHEELS, BEARINGS AND LUBRICANTS

James M. Budd, Troy; Philip W. Sheehan, Tipp City, and John H. Warren, Troy, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Sep. 4, 1990, Ser. No. 577,417
Int. Cl.[5] G01M *19/00*
U.S. Cl. 73—118.1 **21 Claims**



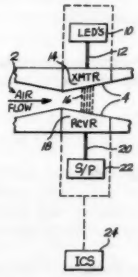
1. Test apparatus, comprising drive motor means connected with a fixed support, a wheel means including a hub and wheel web connected with the motor means and rotatable by the motor means through the wheel web connection, non-rotatable axle means upon which the wheel means is rotatably mounted via wheel bearings set in the wheel hub, a load application mechanism disposed in offset manner with respect to with said axle means, at least one movable connecting member connecting together the load application mechanism and one of the axle means and the wheel web, load sensing devices associated with the load application mechanism, and control means, so that activation of the load application mechanism inherently effects through the axle means and wheel means the selective imposition of radial, axial and moment loading through the wheel web and wheel hub upon the wheel bearings so that the wheel bearings experience realistic operating conditions during rotation of the wheel means by the motor means and when the wheel means is at rest, wherein the axle means upon which the wheel means is mounted via wheel bearings is movable, and a movable connecting member connects together the load application mechanism and movable axle means, the axle means being attached fixedly to the connecting member, wherein the connecting member comprises a generally L-shaped member having one leg which extends generally parallel to the axle means and an axial and moment load application mechanism attached to the end of said one leg, and a radial load application mechanism attached to said one leg disposed substantially orthogonally relative to said axle means.

5,072,612

SYSTEM FOR DETERMINING POSITION OF NORMAL SHOCK IN SUPERSONIC FLOW

Donald G. Iverson, Jr., Vashon, and Troy D. Daiber, Kirkland, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 7, 1990, Ser. No. 564,539
Int. Cl.[5] G01M *19/00*
U.S. Cl. 73—118.2 **20 Claims**



13. A system for detecting a normal shock in intake flow in a supersonic inlet of an aircraft power plant, comprising:

an array of light sensors along a sidewall of said inlet, said array extending substantially parallel to said flow;

a projector positioned to project a sheet of light across said inlet toward said array and perpendicular to said flow; and

means for comparing an intensity profile of said sheet of light obtained through said array of sensors with a predetermined intensity profile corresponding to a no-shock condition, and for identifying a position of the normal shock by identifying sensors with an intensity level deviating from said predetermined profile.

5,072,613

METHOD FOR EVALUATION OF FLUID FLOW WITHIN A SIMULATED COMBUSTION CHAMBER

Patrick H. Baer, Royal Oak; Timothy F. Connolly, Sterling Heights; Gerald P. Kopinski, Farmington Hills; Curtis E. Rowley, Royal Oak, and Anthony W. Senkow, Yale, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

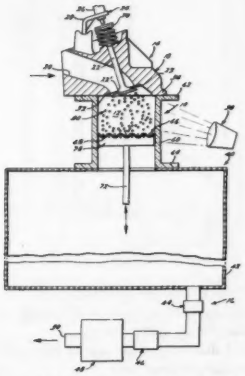
Division of Ser. No. 450,888, Dec. 14, 1989, Pat. No. 4,996,875.
This application Sep. 24, 1990, Ser. No. 587,823
The portion of the term of this patent subsequent to Mar. 5, 2008, has been disclaimed.
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—119 R **6 Claims**

1. A method of flow testing the design of a valved cylinder head for an internal combustion engine, and particularly the air intake portion of the valved cylinder head comprising:

providing a transparent sleeve to simulate a cylinder bore of an engine and to partially define a simulated combustion chamber, said sleeve having two ends, one end covered by the valved cylinder head a second end forming an air

outlet for a flow of air through the sleeve, providing a permeable member within said sleeve at an axial position in the sleeve corresponding to a position of a piston in an actual engine which is conforms to a selected valve opening in the cylinder head whereby said member is substantially permeable to fluid flow from the one end to the other of said sleeve, positioning a plurality of lightweight members in said space in the sleeve downstream of said one end and the cylinder head and upstream of the permeable member;

providing said valved cylinder head with a particular configuration of an inlet port and intake valve opening for evaluation of the effects on fluid flow therefrom into the sleeve,



passing a flow of fluid through said valved inlet port into said transparent sleeve and from the sleeve's second end whereby one or more types of fluid flow patterns are generated in said space in said sleeve, said fluid flow moving said lightweight members in said one or more types of fluid flow patterns;

identifying the type of fluid flow pattern in the simulated combustion chamber by visually observing patterns of the movement of the lightweight members in the fluid flow stream; and

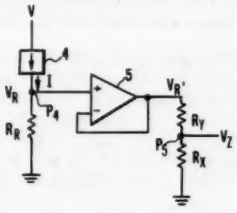
evaluating the effects on flow patterns caused by specific configurations of the inlet port design of selected successive cylinder heads from one or more viewed patterns of the movements of the lightweight members.

5,072,614

TEMPERATURE COMPENSATING CIRCUIT

Tetsuo Hisanaga, Yokohama, Japan, assignor to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1990, Ser. No. 478,611
Claims priority, application Japan, Mar. 10, 1989, 1-59266
Int. Cl.[5] G01F *1/68*
U.S. Cl. 73—204.19 **3 Claims**



3. In a microbridge fluid flow sensor in which first and second temperature responsive elements are formed on a semiconductor substrate adjacent a heating element and are arranged so that fluid flow causes a differential heating of one of said temperature response elements relative to the other, a circuit for measuring said flow comprising in combination:

means connecting said first and second temperature responsive elements in series with one end respectively of each said first and second elements connected to a common electrical point and means for connecting said common point to a circuit for indicating fluid flow as a function of the voltage at said point;

a third temperature responsive element formed on said semiconductor substrate;

a means for providing a constant current coupled to said third temperature responsive element for establishing a voltage drop across said element that is a function of the ambient temperature of said fluid;

amplifier means having an input and a high impedance output;

means for coupling the voltage drop across said third element to the input of said amplifier means;

means for coupling the high impedance output of said amplifier means to said first and second elements coupled in series;

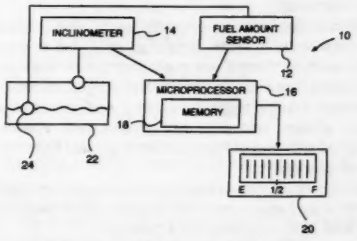
said amplifier means establishing a current through said first and second elements connected in series at a voltage that is a function of the voltage drop across third element.

5,072,615

APPARATUS AND METHOD FOR GAUGING THE AMOUNT OF FUEL IN A VEHICLE FUEL TANK SUBJECT TO TILT

Ryszard Nawrocki, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 17, 1990, Ser. No. 628,749
Int. Cl.[5] G01F *23/00*; H01H *35/18*
U.S. Cl. 73—291 **12 Claims**



1. Apparatus for gauging an amount of liquid fuel remaining in a vehicle fuel tank, said apparatus being capable of differentiating between a level condition wherein the fuel tank is substantially parallel to a reference plane and an unlevel condition wherein the fuel tank is momentarily askew to such reference plane as during acceleration or cornering, the apparatus comprising:

sensor means for measuring the amount of fuel in the tank and for generating a digital output signal indicative of such amount;

inclinometer means for detecting the condition of the fuel tank relative to said reference plane and for generating a digital output signal indicative of the degree to which the fuel tank is askew to said reference plane;

electronic memory means for storing the signal indicative of the amount of fuel in the tank;

a microprocessor for accepting the signals from the sensor means and from the inclinometer means and for resetting the electronic memory means while the vehicle is in motion with a corrected signal indicative of the amount of fuel in the fuel tank, said corrected signal calculated by applying a correction factor corresponding to the degree

to which the fuel tank is askew to the reference plane to the signal received from the sensor means; and

a fuel gauge operatively coupled to said microprocessor for displaying the amount of fuel in the tank as stored in the electronic memory means.

5,072,616

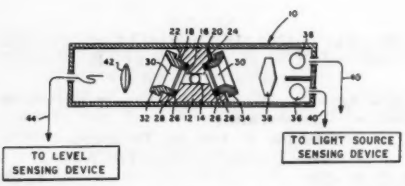
FIBER OPTIC LEVEL ALARM

Ronald E. Sherrick, Lancaster, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 816,968, Jan. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 564,941, Dec. 23, 1983, abandoned. This application Jun. 16, 1989, Ser. No. 368,082

Int. Cl.[5] G01F *23/02*

U.S. Cl. 73—293 **2 Claims**



1. A liquid level gauge for directly indicating a level of a fluid, comprising:

a body member having a generally trapezoidal configuration in cross-section, a first port glass provided in one of the side surfaces thereof, a second port glass in the oppositely disposed side surface thereof and a light refracting fluid passage therethrough connecting said first and second port glasses, said first and second port glasses being aligned with and obliquely offset from said light refracting fluid passage;

a plurality of redundant light sources, located adjacent a rear wall of said gauge provided to ensure the presence of light in said light refracting fluid passage;

a first condensing lens, interposed between said plurality of light sources and said first port glass, to direct a beam of light from said plurality of light sources through said first port glass into said light refracting fluid passage;

a second condensing lens, interposed between a first optical fiber cable and said second port glass, said first optical fiber cable being positioned so as to intercept said light beam after it exits from said light refracting fluid passage and passes through said second port glass and said second condensing lens when there is no liquid at said level in said light refracting fluid passage and to not intercept said light beam after it exits from said light refracting fluid passage and passes through said second port glass and said second condensing lens when there is liquid at said level in said light refracting fluid passage; and

a plurality of optical fibers, one provided adjacent to a respective one of said light sources in said plurality of light sources, positioned so as to intercept a portion of the light produced by said respective one of said light sources and provide an indication as to whether any one of said light sources in said plurality of light sources is illuminated at all times.

5,072,617

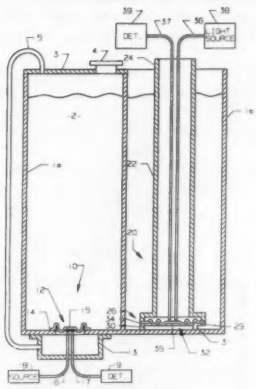
FIBER-OPTIC LIQUID LEVEL SENSOR

Jonathan D. Weiss, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 30, 1990, Ser. No. 605,609

Int. Cl.[5] G01F *23/16*

U.S. Cl. 73—299 **8 Claims**



1. A liquid level sensor comprising:

a container for holding a column of liquid;

a pressure transducer comprising:

a corrugated diaphragm having an edge portion surrounding a central portion; and

mounting means for holding said diaphragm only by said edge portion with only one side of said diaphragm in contact with the pressure head of said column of liquid, movement of said central portion providing a linear mechanical output representative of the hydrostatic pressure exerted at the bottom of said column; and

output means for measuring said mechanical output and providing an electrical signal representative of the depth of the column of liquid, said output means comprising:

a light source;

means for reflecting light from said source from said other side of said diaphragm; and

means for detecting the intensity of the reflected light from said diaphragm.

5,072,618

ADJUSTABLE LPG GAUGE

Carl A. Taylor, Carollton, and Robert E. Hrncir, Dallas, both of Tex., assignors to Rochester Gauges, Inc., Dallas, Tex.

Filed Sep. 21, 1990, Ser. No. 585,997

Int. Cl.[5] G01F *23/76*

U.S. Cl. 73—317 **5 Claims**

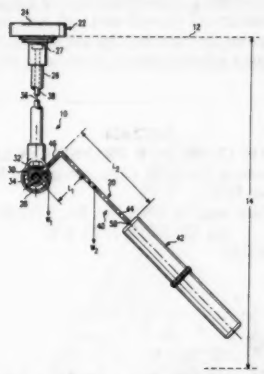
1. An adjustable gauge for use in measuring the level of LP gas in a storage tank where the storage has a height lying within a range from a minimum height to a maximum height, comprising:

a gauge head mounted on the tank, said gauge head including a gear assembly having a first gear mounted thereon for pivotal movement about a first axis and a second gear mounted thereon for pivotal movement about a second axis at an angle to the first axis, the first and second gears each having teeth which are engaged so that rotation of one gear includes a corresponding rotation in the other gear;

a float rod having a first end and a second end, the float rod being secure at its first end to the first gear of the gear assembly, the length of the float rods suitably dimensioned

for installing the adjustable gauge in a tank of height equal to the maximum height;

an elongated float formed out of two portions, one of said float portions having means to receive the second end of said float rod, said float capable of floating in LP gas and supporting the float and float rod through its buoyancy, said float engaged to the float rod at the second end thereof;



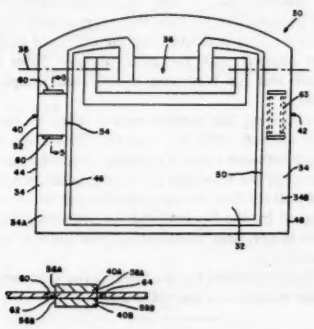
the adjustable gauge being adjusted for use in a specific height tank by disengaging the float from the float rod, removing a length of the float rod from the second end thereof, approximately equal to the difference in height between the maximum height and the actual height of the tank, and reengaging the float on the float rod.

5,072,619

PENDULOUS ASSEMBLY INCLUDING SPECIFICALLY CONFIGURED MOUNTING PADS

Richard A. Hanson, 21220 N.E. 156th St., Woodinville, Wash. 98072

Continuation of Ser. No. 255,619, Oct. 11, 1988, abandoned.
This application Jun. 21, 1990, Ser. No. 541,480
Int. Cl.[5] G01P *15/13*
U.S. Cl. 73—517 B **27 Claims**



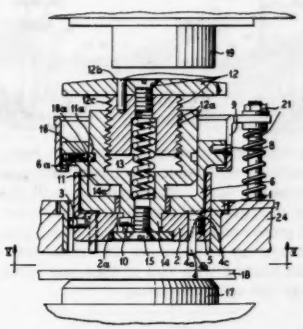
1. In a pendulous assembly for use in an accelerometer or other such force sensing device, said assembly including a flat proofmass, means including a flat frame supporting said proofmass for back and forth pivotal movement about a given axis through a horizontal resting plane which contains said proofmass and said frame when the proofmass is at rest, the improvement comprising at least one pair of vertically aligned top and bottom generally rectangular mounting pads connected with the top side and the bottom side of said frame, respectively, for mounting the frame and proofmass to a main support forming part of the force sensing device, said mounting pads having first vertically aligned, horizontally extending lateral edges parallel with said given axis and second vertically aligned, horizontally extending lateral edges parallel with said given axis, said pads being configured so that at least most of their first lateral edges together with sections of said frame between the pads define a first single vertically continuous exposed edge, said pads being configured so that at least most of their second lateral edges together with sections of said frame between the pads define a second single vertically continuous exposed edge, wherein said frame including a pair of frame sections which extend on opposite sides of said proofmass normal to said given axis, wherein said one pair of mounting pads is connected with one of said frame sections on one of said sides of said proofmass, and wherein said pendulous assembly includes a second substantially identical pair of vertically aligned top and bottom mounting pads connected with the other of said frame sections on the opposite side of said proofmass.

5,072,620

STAMPING TOOL

Ronald C. Hill, Corfu; Richard M. Eckert, Amherst, and Anthony Marzullo, Buffalo, all of N.Y., assignors to Strippit, Inc., Akron, N.Y.

Filed Oct. 2, 1989, Ser. No. 416,392
Int. Cl.[5] B21J *13/00*; B41J *1/54*
U.S. Cl. 72—414 **9 Claims**



1. A stamping tool for stamping indicia onto a work piece, comprising:

a plurality of stamping punches;

punch ring means for holding said plurality of punches at an elevated position relative to said work pieces;

striker ring means for selectively moving at least one of said punches at a time into an engagement position with respect to said work piece;

means for adjusting the distance said punches are moved from said elevated position to said engagement position; and

said punch ring means and said striker ring means being connected by a releasable means such that said punch ring means and said striker ring means are capable of vertical movement in unison.

5,072,621

PIPELINE LEAK DETECTOR APPARATUS AND METHOD

Detlev E. M. Hasselmann, 519 South Nardo, Solana Beach, Calif. 92075

Filed Jun. 25, 1990, Ser. No. 543,355
Int. Cl.[5] G01M *3/08*
U.S. Cl. 73—40.50 R **16 Claims**

1. Pipeline leak detector apparatus comprising:

a liquid containing tank;

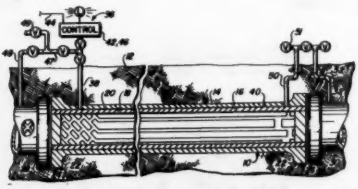
dispenser valve means remote from said tank;
liquid conduit means connected between the interior of said tank and said dispenser valve means;
shut-off valve means in said conduit means intermediate said tank and said dispenser valve means;
pump means coupled in said conduit means on the tank side of said shut-off valve means and configured to apply fluid under pressure to said liquid conduit means and said dispenser valve means; and
flow meter means connected in said conduit means in parallel with said shut-off valve means, said flow meter means and said shut-off valve means being a parallel combination in series with said jump means; said flow meter means being configured to maintain equal pressure on both sides of said shut-off valve means and to indicate any liquid flow therethrough.

5,072,622

PIPELINE MONITORING AND LEAK CONTAINMENT SYSTEM AND APPARATUS THEREFOR

Max J. Roach, and John A. Whitehead, both of P.O. Box 966, Longview, Tex. 75606

Filed Jun. 4, 1990, Ser. No. 532,561
Int. Cl.[5] G01M *3/28*
U.S. Cl. 73—40.5 R **18 Claims**



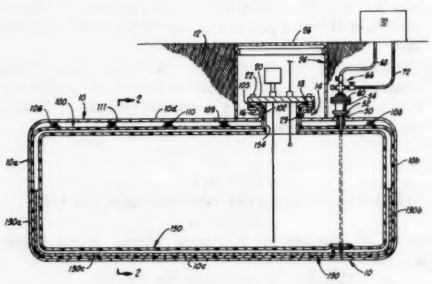
1. A pipe monitoring system comprising at least one pipe having an interior wall, flexible liner means having an exterior surface substantially flush with the interior wall of said pipe, and at least one groove located in said exterior surface, wherein said groove and said interior wall of said pipe define at least one passageway and pressure differential leak detection means communicating with said at least one passageway to detect leakage into said passageway.

5,072,623

DOUBLE BLADDER FLUID CONTAINMENT SYSTEM

John A. Hendershot, Shawnee, Okla., assignor to World Enviro Systems, Inc., Shawnee, Okla.

Filed Jun. 25, 1991, Ser. No. 720,664
Int. Cl.[5] G01M *3/32*
U.S. Cl. 73—49.2 **6 Claims**



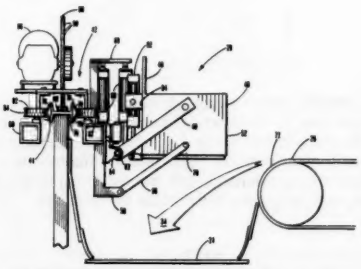
1. A fluid containment system comprising:
a rigid external tank;
an outer flexible bladder of complementary configuration to said rigid external tank positioned within said rigid external tank and adjacent the inner surface of said external tank;
suspension means between the external tank and outer flexible bladder for suspending the outer flexible bladder within, and adjacent, the external tank;
an inner flexible bladder of complementary configuration to the outer bladder located within, and adjacent, the outer bladder; and
a vacuum-developing subassembly located outside said tank, and communicating through said tank with the interstitial space between the outer bladder and the inner bladder for maintaining a subatmospheric pressure in said interstitial space.

5,072,624

AUTOMATIC CONVEYOR TRANSITION SAMPLER

Jim R. Montgomery, Portland, Oreg., assignor to Beloit Corporation, Beloit, Wis.

Filed Aug. 22, 1990, Ser. No. 570,675
Int. Cl.[5] G01N *1/20, 1/18*
U.S. Cl. 73—863.91 **6 Claims**



1. A sampler for a flow of particulate material on a conveyor system having at least one transfer point from a first to a second conveyor, comprising:
a sample bucket having sides and a bottom for retaining sampled material;
a fixed linear track spaced from the second conveyor;
a traveling rig which mounts the sample bucket to the track and which permits the bucket to move along the track;
a sample collector spaced from the second conveyor;
means for transporting the traveling rig and bucket along the track from a first position over the collector to a second position aligned with the material flow from the first conveyor and for returning a collected sample to the collector;
means for moving the sample bucket when in the second position aligned with the material flow from the first conveyor between a raised position where the bucket does not intercept the flow and a lowered position where substantially all the flow of material from the first conveyor is intercepted by the bucket, and for retracting the bucket from the lower, flow intercepting, position after a selected time; and
bucket emptying means for discharging the sampled material from the bucket into the collector.

5,072,625

LIQUID LEVEL AND SAMPLING GAUGE

Robert V. Anderson, 4617 Ranch View Rd., Fort Worth, Tex. 76109

Filed Apr. 25, 1990, Ser. No. 514,191
Int. Cl.[5] G01N *1/12;* **G01F** *23/04*
U.S. Cl. 73—864.63 **11 Claims**

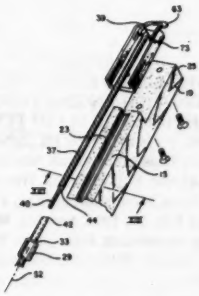
1. A liquid level and sampling gauge, comprising:
an elongate stick having an elongate, vertical face with a groove formed therein;
a transparent sample tube mounted in said groove and ex-

tending at least partly up said elongate, vertical face of said stick, said sample tube having a bottom opening and a top opening;

a rigid rod located within said sample tube and having an upper end and a lower end which normally extends at least partly from said sample tube bottom opening;

valve means located on said rod lower end, said valve means being movable between open and closed positions to alternately allow liquid to pass therethrough when in the open position and to prevent passage of liquid when in the closed position;

a valve operator connected to the rod upper end for moving the valve means between the open and closed positions;



wherein said valve means comprises an o-ring carried in an O-ring groove provided on said rod lower end, said O-ring being adapted to slidingly engage a valve seat provided adjacent said tube bottom opening as said rod is moved vertically upward within said tube; and

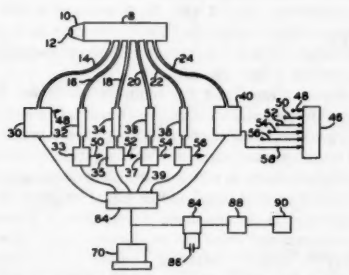
wherein said tube is formed of a flexible synthetic elastomer and wherein said stick is provided with a rigid sole plate, said sole plate including an upwardly extending rigid sleeve which is received concentrically within the interior of said tube so that the O-ring engages the interior of the sleeve rather than the interior of the tube.

5,072,626

MEASUREMENT OF ULTRAFINE PARTICLE SIZE DISTRIBUTIONS

David S. Ensor, Chapel Hill, N.C., and Gilmore J. Sem, Lauderdale, Minn., assignors to Research Triangle Institute, Research Triangle Park, N.C.

Filed Jul. 14, 1989, Ser. No. 379,826
Int. Cl.[5] G01N *1/00*
U.S. Cl. 73—865.5 **15 Claims**



1. A system for measuring ultrafine particle distributions in a gas comprising:

a particle counting array including a plurality of diffusion stages;

each of said diffusion stages passing substantially only those particles above a certain predetermined size; and

a particle counter connected in series with each of said diffusion stages;

a vacuum system for drawing particle laden gas through each of said diffusion stages, and then through its associated particle counter to which it is connected in series;

means to connect each of said diffusion stages to substantially the same localized area in order that each of said diffusion stages and its associated particle counters are continuously provided with a portion of similar gas at substantially the same time;

and means to provide a signal representative of the distribution of particles of various sizes passing at substantially the same time through each of said diffusion stage and its associated particle counter;

wherein said particle counters are condensation nucleus detectors;

said diffusion stages are screen diffusion stages each having a different number of screens to provide a different particle-pass filter;

said particle counter array counts ultrafine particles having a diameter in the range of 0.002 to 0.2 microns; and

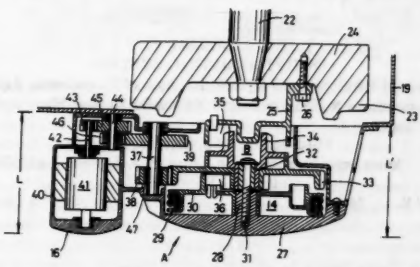
said means to connect said diffusion stages to substantially the same localized area includes a manifold probe comprising an inlet and a plurality of outlets, each of said inlet and outlets being connected directly to an intermediate body to form a manifold, said outlets being separately connected to the upstream end of each of said particle counters and said diffusion stages.

5,072,627

STARTING APPARATUS FOR AN ENGINE

Fusamaro Horiye, and Hitoshi Ishii, both of Osaka, Japan, assignors to Yanmar Diesel Engine Co., Ltd., Osaka, Japan

Continuation of Ser. No. 396,269, Aug. 21, 1989, abandoned.
This application Apr. 8, 1991, Ser. No. 681,661
Claims priority, application Japan, Oct. 14, 1988, 63-260202
Int. Cl.[5] F02N *3/02, 11/00*
U.S. Cl. 74—6 **6 Claims**

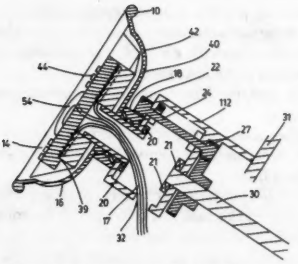


1. A starting apparatus for a 4-cycle gasoline engine having a crankshaft, a fan case around said crankshaft and means for automatically releasing the compression in said engine at a crankshaft revolution region not greater than 350 rpm and at which starting of said engine is to be initiated, said starting apparatus comprising a starter motor case mounted on said fan case, a starter motor and a recoil starter mounted in said starter motor case, said starter motor having a capacity for starting said engine at a crankshaft revolution region not greater than 350 rpm and being interconnected with a rotary portion of said recoil starter for starting said engine with a selected one of said starter motor and said recoil starter and a power supply battery for energizing said starter motor, said starter motor and said recoil starter being of substantially the same length in the axial direction of said crankshaft.

5,072,628
MULTI FUNCTION STEERING MECHANISM FOR A MOTOR VEHICLE

T. Jack Oki, 96 Banbury Rd., Don Mills, Ontario M3B 2L3, Canada

Continuation-in-part of Ser. No. 409,425, Sep. 19, 1989, abandoned. This application Jul. 6, 1990, Ser. No. 549,640
Int. Cl.[5] B62D *7/00*
U.S. Cl. 74—484 R **9 Claims**



1. A multi function steering mechanism for a motor vehicle, including a display console, comprising:

a non-rotatable, hollow support member carrying a rotatable steering wheel at one end and disengagably attachable with a steering shaft of the motor vehicle at the other end;

the steering wheel being engagable with the steering shaft via an elongate link journalled in the hollow support member end located to be offset from the steering shaft when it is attached to the steering shaft, the link being operatively connected at one end to the steering wheel and being operatively engagable at another end to the steering shaft whereby the axis of rotation of the steering wheel is aligned with the steering shaft and rotation of the steering wheel acts to rotate the link and, hence, when connected, the steering shaft;

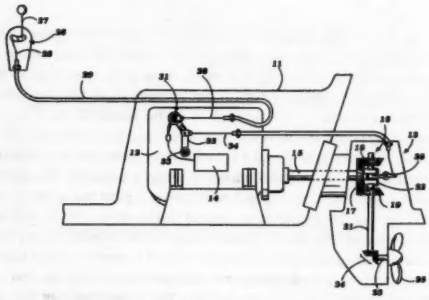
a display panel non-rotatably connected to the support member having a front display face located within the periphery of the steering wheel;

a wiring truss within the support member, individual wires of which wiring truss are directly connected to individual units of the display panel.

5,072,629
SHIFT ASSISTING SYSTEM

Itsushi Hirukawa, and Ryoichi Ito, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 5, 1990, Ser. No. 577,872
Claims priority, application Japan, Sep. 5, 1989, 1-229656
Int. Cl.[5] B63H *21/21*
U.S. Cl. 74—851 **5 Claims**

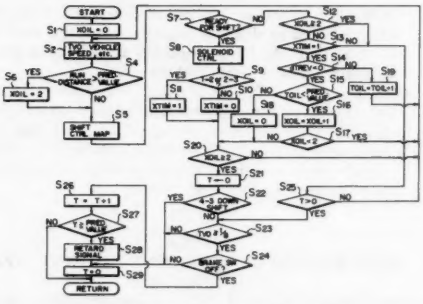


1. A shift assisting mechanism for assisting the shifting of a dog clutch of a transmission driven by an internal combustion engine by reducing the speed of said engine, said transmission comprising a control member selectively movable by an operator for selecting a shift, an actuator for moving said dog clutch to a shift condition, interconnecting means between said control member and said actuator for transmitting motion therebetween, and pressure sensitive conductive rubber means for measuring a predetermined resistance of movement of said dog clutch to its shift position without requiring lost motion for actuating said shift assisting mechanism.

5,072,630
CONTROL SYSTEM FOR VEHICLE WITH AUTOMATIC TRANSMISSION WITH ENGINE TORQUE CONTROL HAVING THE HYDRAULIC FLUID TEMPERATURE AS A CONTROL PARAMETER DURING SHIFTING

Toshiyuki Kikuchi, Higashihiroshima; Masaki Fujii; Mitsutoshi Abe, both of Aki, and Yuji Matsuno, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 20, 1990, Ser. No. 481,326
Claims priority, application Japan, Feb. 21, 1989, 1-42170
Int. Cl.[5] F16H *59/72, 61/08*
U.S. Cl. 74—858 **19 Claims**



1. A control system for a vehicle, comprising:

an automatic transmission provided with a multiple transmission gear mechanism in which a specific gear stage, with a particular speed ratio, is automatically established from among a plurality of gear stages in accordance with at least one vehicle operating condition,

a transmission control unit for generating a shift control signal in order to produce a shift operation between different gear stages in accordance with the at least one vehicle operating condition, and

an engine control unit for reducing an engine output in synchronism with the shift operation so as to suppress a torque shock due to the shift operation, wherein

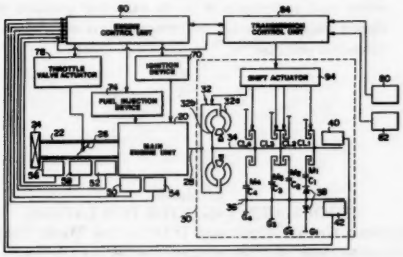
said transmission control unit detects a specific vehicle operating condition, in which a time lag between generation of the shift control signal and an actual initiation of the shift operation in the automatic transmission is greater than a predetermined value and producing a signal denoting the specific vehicle operating condition, reduction of the engine output being restricted when said specific vehicle operating condition is detected, the shift operation being carried out by virtue of a hydraulic fluid, the transmission control unit detecting a parameter connected with a viscosity of the hydraulic fluid. connection with a viscosity of the hydraulic fluid.

5,072,631

CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE INSTALLED IN VEHICLE WITH AUTOMATIC TRANSMISSION

Sachito Fujimoto, and Toshitaka Imai, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 11, 1990, Ser. No. 580,678
Claims priority, application Japan, Sep. 12, 1989, 1-107083[U]
Int. Cl.[5] B60K *41/06*
U.S. Cl. 74—860 9 Claims



1. A system for controlling an internal combustion engine installed in a vehicle with automatic transmission, comprising:

first means for detecting torque transmission state of the vehicle transmission and for outputting a detected value;

second means for comparing the detected value with a first reference range, the second means reducing the engine output torque by a first amount when the detected value is found to be outside of the first reference range; and

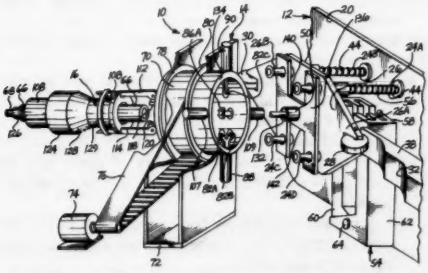
third means for comparing the detected value with a second reference range, the third means for further reducing the engine output torque by a second amount which is greater than the first amount when the detected value is found to be within the second reference range.

5,072,632

MULTICONDUCTOR CABLE STRIPPER

Babak Sayyadi, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 23, 1991, Ser. No. 645,040
Int. Cl.[5] H02G *1/12*
U.S. Cl. 81—9.51 15 Claims



1. A cable stripper for removing a slug portion from the end of a jacket that makes up the outer covering of a multiconductor cable, for exposing the ends of said cable's conductors to make them accessible for subsequent electrical connections, said stripper comprising:

a clamp assembly for fixedly holding said cable during a cable stripping operation, said clamp assembly having a cable guide member that is shaped to hold one end of said cable in a position so that said end projects outwardly from said guide member; and

a cutting and bending assembly positioned adjacent said clamp assembly, and adapted to receive said cable's end, said cutting and bending assembly including:

a plurality of cutting blades that are movable radially inwardly into centering contact around said jacket, said blades being circularly movable about said cable's end when in such contact, for scoring said jacket around its circumference and defining the length of said slug portion; and

at least one bending member that is movable to a plurality of circumferential locations around said cable's end, and further being reciprocally movable back and forth at each one of said locations, to push transversely against said slug portion, for bending said cable's end back and forth to break away said slug portion at the place where it was scored by said blades; and

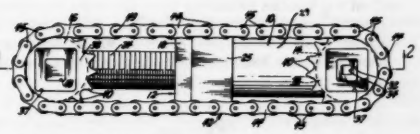
a slug puller for removing said slug portion from said cable's end after said slug portion has been broken away by said at least one bending member, said slug puller being reciprocally movable between at least one extended position that is adjacent said broken-away slug portion, and a retracted position that is axially spaced from said cable's end, said slug puller having opposing gripping surfaces operable to cooperatively grip the outer surface of said broken-away slug portion when said slug puller is in said at least one extended position, and operable to pull said brokenaway slug portion off said cable's end as said slug puller moves to said retracted position.

5,072,633

DRIVE EXTENSION

Roger R. Smith, 7261 Lyons Rd., Imlay City, Mich. 48444

Continuation-in-part of Ser. No. 578,033, Sep. 4, 1990, abandoned. This application Mar. 7, 1991, Ser. No. 666,535
Int. Cl.[5] B25B *17/00*
U.S. Cl. 81—57.3 2 Claims



1. An improved drive extension for use with a drive assembly comprising: an adjustable frame member having an adjustable center portion formed of a threaded rod and a cylindrical extension, the threaded rod and cylindrical extension being threadably engaged so that relative rotation therebetween will cause the frame member to vary in length, the threaded rod having locking means including a collar which engages the cylindrical extension and a threaded flange, the collar having a key extending radially inward, the key engaging a corresponding slot in the threaded rod to keep the adjustable center portion aligned, the collar locking the frame at the desired length when closed and the threaded flange being rotatable on the threaded rod rotated to hold the collar in position thereby locking the frame member at a desired length; first and second mounting members, one mounting member being attached to each end of the frame member and being adapted to rotatably hold drive means; an input drive means rotatably mounted in the first mounting member, the input drive means being adapted to receive an externally applied force, and having attached thereto a first sprocket which is rotated when a rotating force is applied to the drive means; an output drive means rotatably mounted in the second mounting member, the output drive means is adapted to engage means for applying a rotating force to a desired location; a second sprocket attached to the output drive means; an adjustable endless chain, said chain being adjustable so that it is disposed about the two sprockets

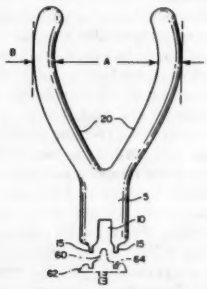
with minimal slack whereby a force applied to the input drive will cause rotation of the first socket and through the chain the rotation of the second socket rotating the output drive.

5,072,634

DEVICE FOR REMOVING SPIKES FROM SHOES

Fred Ryder, 1992 Cambridge Dr., Crofton, Md. 21114

Filed Oct. 10, 1990, Ser. No. 597,348
Int. Cl.[5] B25B *13/48*
U.S. Cl. 81—176.15 **9 Claims**



1. A device for removing a golf spike from a golf shoe, the device enabling the application of a rotational force to the golf spike to facilitate the spike's removal, the device comprising:

(a) a body having a recess adapted to receive a spike portion of a golf spike when the body is positioned on the golf spike;

(b) two rigidly spaced-apart male members adapted to engage female receptacles in a golf spike, the male members having generally parallel longitudinal axes extending a first direction from the body with the recess therebetween; and

(c) two rigidly spaced-apart handles extending from the body for enabling application of a rotational force to the body,

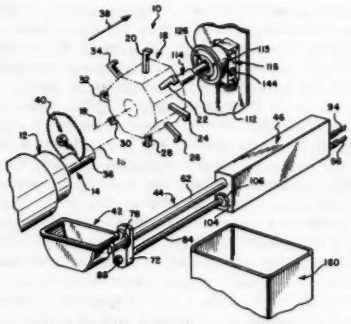
each of the handles extending from the body in a direction generally opposite the first direction, said handles being spaced apart so that said handles can be held simultaneously by one hand or can be held individually by two hands.

5,072,635

FINISHED PART COLLECTION SYSTEM FOR AUTOMATED TURRET LATHE

Bruce White, 7077 Catalina Trail, Apple Valley, Calif. 92308

Filed Feb. 16, 1990, Ser. No. 480,829
Int. Cl.[5] B23B *3/00*
U.S. Cl. 82—124 **12 Claims**



12. An automatic turret lathe having a chuck carrying work stock and a turret head that performs machining operations on a portion of said work stock and means for thereafter severing said portion of said work stock to create finished parts, the improvement comprising:

a concave finished part receptacle,

an elongated arm carrying said receptacle thereon

translating means for moving said receptacle between an extended position proximate to said chuck and directly beneath said portion of said work stock and a retracted position remote form said chuck, and

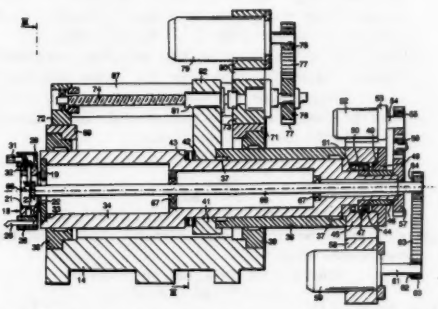
rotating means operated by said translating means to rotate siad receptacle from a disposition facing concave upward when said receptacle is in its extended position and a tipped disposition when said receptacle is withdrawn to its retracted position.

5,072,636

TOOL-CARRYING SLIDE FOR LATHES

Francesco Gueli, Borgofranco D'Ivrea, and Mario Prandoni, Legnano, both of Italy, assignors to OCN-PPL S.p.A., Legnano, Italy

Filed Mar. 7, 1990, Ser. No. 489,501
Claims priority, application Italy, Mar. 16, 1989, 67186 A/89
Int. Cl.[5] B23B *21/00*
U.S. Cl. 83—132 **10 Claims**



1. A machine tool-carrying slide, comprising;

a slide member;

a cylindrical hollow body axially and slidably mounted along said slide member;

a sleeve coaxially and rotatably mounted to said cylindrical hollow body;

a clutch, interconnecting said sleeve and said cylindrical hollow body, said clutch adapted to permit rotational motion of said sleeve regardless of axial motion of said sleeve and said cylindrical hollow body along said slide;

a turret adapted to hold a plurality of tools, said turret mounted on said slide member, and said turret secured to said sleeve;

said sleeve and said hollow body adapted for axially movement along said slide member between a working position and a retracted position,

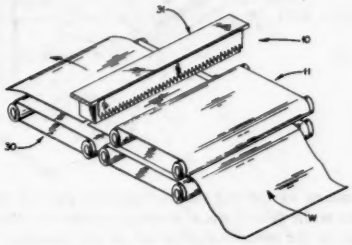
said slide member further comprising a motor, said motor comprising a reversible electric motor carried by said hollow body, said electric motor being controlled at the beginning of a working operation to rotate said sleeve to a preselected position corresponding to the tool to be selected for the next working operation, and being controlled during the working operation for continuously rotating said sleeve.

5,072,637

APPARATUS AND METHOD FOR SEGMENTING CONTINUOUS WEBS INTO PREDETERMINED LENGTHS

Abraham N. Reichental, Southbury, and Alex Shafir, Watertown, both of Conn., assignors to Sealed Air Corporation, Saddle Brook, N.J.

Filed Apr. 30, 1990, Ser. No. 516,799
Int. Cl.[5] B26D 7/04
U.S. Cl. 83—23 16 Claims



1. An apparatus for continuous web segmenting into sheets of predetermined length comprising:

continuous web supply means;

web delivery means comprising

upper feed assembly and lower feed assembly positioned one above and forced against the other forming a nip for receiving said continuous web said nip being resistant to the introduction of said web,

said upper and lower feed assembly being interconnected by a drive means whereby said feed assemblies are positively driven in opposite directions,

said feed assemblies forming oppositely disposed upper and lower friction surfaces whereby said continuous web is delivered therebetween along a predetermined path of travel to web cutting means,

said upper feed assembly being adapted to reduce the force exerted by said upper feed assembly against said lower feed assembly as said continuous web enters said nip and said upper feed assembly being adapted to increase the clamping force on said continuous web during segmenting,

web cutting means downstream of said web delivery means comprising

cutting blade for segmenting said continuous web while said continuous web is clamped between said upper and lower feed assemblies, and

upper web exit clamping means extending laterally across the plane of said web, and

lower web exit clamping means disposed on the opposite side of said web from said upper web exit clamping means to facilitate the severance of said continuous web, and

means for removing said severed web from said web cutting means.

13. A method for successively segmenting continuous webs into sheets of predetermined lengths comprising the steps of:

advancing said continuous web into a nip formed by upper feed assembly and lower feed assembly positioned one above and forced against the other along a generally horizontal predetermined path to a web cutting position,

reducing the force exerted by said upper feed assembly against the lower feed assembly as said web enters said nip, and equalizing said force as the continuous web advances between the upper and lower assemblies to said web cutting position,

engaging and clamping said continuous web in an immovable position on the downstream side of said cutting position,

engaging and clamping said continuous web on the upstream side of said cutting position by said upper and lower feed assemblies while in said immovable position,

cutting said continuous web to predetermined sheet length while said web is in said immovable position,

releasing said continuous web and said sheet from said immovable positions, and

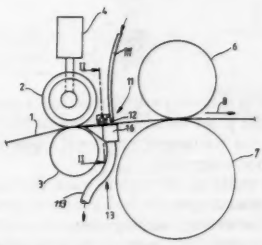
removing said sheet from the cutting position.

5,072,638

APPARATUS FOR SEVERING AND DEDUSTING WEBS OF PAPER OR THE LIKE

Peter Hüser, Hamburg, Fed. Rep. of Germany, assignor to E C.H. Will GmbH, Hamburg, Fed. Rep. of Germany

Filed Feb. 28, 1990, Ser. No. 486,514
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1989, 3906376
Int. Cl.[5] B26D 7/18
U.S. Cl. 83—24 10 Claims



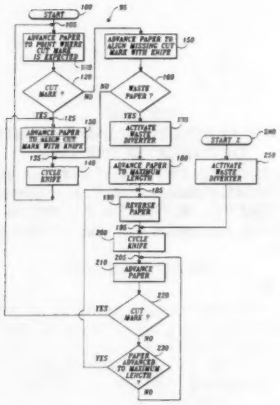
1. Apparatus for subdividing a running web of paper or the like, comprising means for advancing the web in a predetermined direction along a predetermined path; means for severing the web in a predetermined portion of said path with attendant formation of a slot extending in said direction and of web fragments; and means for removing the fragments from said path, including a first pneumatic removing unit at one side and a second pneumatic removing unit at the other side of said path, said removing units including means for removing fragments in a second direction substantially transversely of said predetermined direction, the removing means of one of said units including means for directing at least one stream of gaseous fluid against the severed web in the region of the slot and the removing means of the other of said units including at least one suction intake adjacent said slot, said path being substantially horizontal in the region of said removing means, said one unit being disposed above and said other unit being disposed below said path, said directing means including at least one nozzle arranged to discharge at least one stream of compressed gaseous fluid.

7. A method of subdividing a web of paper or the like, comprising the steps of advancing the web in a predetermined direction along a predetermined path; severing the running web with attendant formation of a slot extending in said direction and of fragments of the web; and removing the fragments including blowing a compressed gaseous fluid against the web in the region of the slot at one side of a portion of said path, and pneumatically collecting the fragments in the region of the slot at the other side of said portion of said path, said blowing step including directing at least one stream of compressed air against the severed web at least substantially at right angles to said predetermined direction.

5,072,639
METHOD AND APPARATUS FOR REMOVING WASTEPAPER FROM A CONTINUOUS WEB OF PHOTOGRAPHIC PRINTS

Richard A. Dolf, Seattle, Wash., assignor to Gretag Systems, Inc., Bothell, Wash.

Filed Jun. 5, 1991, Ser. No. 710,795
Int. Cl.[5] B26D *5/34*
U.S. Cl. 83—42 **10 Claims**



1. A method of removing wastepaper from a continuous web of photographic paper on which photographic images have been printed, the wastepaper randomly appearing along the web, the method comprising:

placing cut marks on the web to mark the location of the photographic images;

advancing the web to a cutting means;

sensing the presence or absence of a cut mark and signaling the cutting means to cut the web if a cut mark is sensed;

determining if the length advanced by the web since the last cut mark equals a predetermined maximum length that the web can be advanced and, if the length advanced equals the predetermined maximum length, then reversing the web for a predetermined reverse length and signaling the cutting means to cut the web; and

repeating the steps of advancing, sensing, and determining until a cut mark is sensed.

5,072,640
CUTTING APPARATUS FOR PLASTIC CONVEYOR MODULES

Christopher G. Greve, Covington, and Ronald M. O'Connor, Jefferson, both of La., assignors to The Laitram Corporation, New Orleans, La.

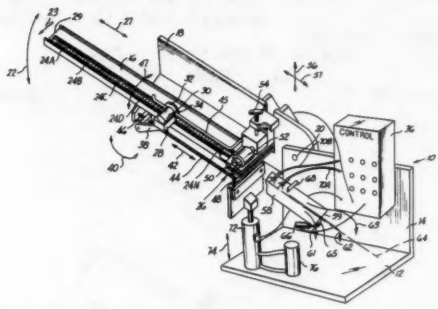
Filed Apr. 30, 1990, Ser. No. 516,522
Int. Cl.[5] B26D *5/40*
U.S. Cl. 83—208 **14 Claims**

1. Apparatus for cutting conveyor belt modules to a selected width comprising in combination,

means for feeding modules past a cutting site to position them with said selected width of the modules extending beyond the cutting site,

a movable cutting blade positioned to enter one surface of the modules to cut off said selected width froms aid module,

a curved anvil surface contacting a surface of said modules opposite the cutting blade tangentially at a cutting line through the module to permit flexing of respective module parts on opposite sides of the blade in response to cutting action,

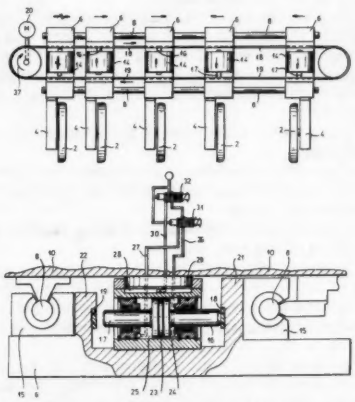


and means for moving the cutting blade through the modules at the cutting site in mating position with the cutting line on the modules defined by the anvil surface.

5,072,641
APPARATUS FOR POSITIONING DEVICES FOR OPERATING UPON SHEETS OR WEBS

Ernst-Günther Urban, and Heiko-Christian Knoll, both of Neuss, Fed. Rep. of Germany, assignors to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Sep. 27, 1990, Ser. No. 589,087
Claims priority, application Fed. Rep. of Germany, Nov. 17, 1989, 3938278
Int. Cl.[5] B26D *1/22*
U.S. Cl. 83—499 **12 Claims**



1. An apparatus for positioning rotary blades of a web-slitting device for slitting a flat workpiece in the form of a web, comprising:

a substantially rectilinear guide for said device;

a slide carrying said rotary blades of said device and shiftable along said guide;

an endless belt having two oppositely moving longitudinal stretches parallel to said guide; and

coupling means on said slide disposed between said longitudinal stretches and having respective elements selectively and alternatively engageable with said stretches to couple said slide to said stretches selectively for movement in the direction of a respective one of said stretches along said guide, said elements being respective piston ends, and said

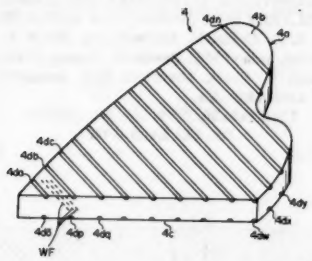
coupling means including a double-acting piston and cylinder unit and said piston ends are ends off a single piston of said unit displaceable in opposite directions in a cylinder of said unit to selectively engage one of said stretches.

5,072,642

REINFORCED SOUND BOARD USED IN MUSICAL INSTRUMENT

Katsuhiko Imagawa, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jul. 24, 1990, Ser. No. 556,422
Claims priority, application Japan, Jul. 28, 1989, 1-196017
Int. Cl.[5] B10C *3/06*
U.S. Cl. 84—193 **15 Claims**



1. A sound board incorporated in a musical instrument comprising

a) a wooden plate member containing wood fibers substantially oriented to a first direction, said wooden plate member having a first modulus of longitudinal elasticity to a force exerted thereto in a direction substantially parallel to said first direction, and

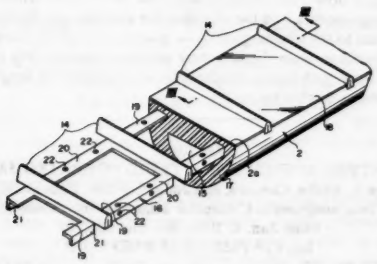
b) a plurality of thread members fixed to at least one major surface of said wooden plate member at spacings and extending in directions substantially parallel to said first direction, each of said thread members having a second modulus of longitudinal elasticity larger than said first modulus of longitudinal elasticity.

5,072,643

STRINGED MUSICAL INSTRUMENT AND MANUFACTURING METHOD OF SAME

Yoshiyuki Murata, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 403,176, Sep. 1, 1989, abandoned. This application Mar. 29, 1991, Ser. No. 680,041
Claims priority, application Japan, Sep. 9, 1988, 63-224785
Int. Cl.[5] G10D *3/00*
U.S. Cl. 84—293 **8 Claims**



1. A stringed musical instrument, comprising:

a neck member formed of a synthetic resin material and having a fingerboard surface on which a fingering operation of a player is to be conducted; and

a fret structure member formed of a metallic material and having a plurality of frets located at predetermined intervals, each of the frets having a base end portion and a top end portion, and a connection member connecting the base end portions of said plurality of frets with one another; wherein

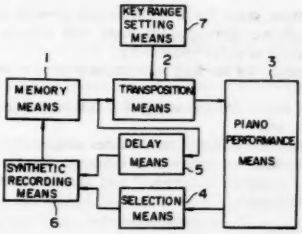
said fret structure member is fixed to said neck member with said base end portions of said frets and said connection member buried in said neck member and with only said top end portions of said frets projecting from said fingerboard surface.

5,072,644

SYNTHETIC RECORDING DEVICE IN AN AUTOMATIC PERFORMANCE PIANO

Yoshimasa Isozaki, and Yasuhiko Oba, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jul. 24, 1990, Ser. No. 557,381
Claims priority, application Japan, Jul. 28, 1989, 1-88886[U]
Int. Cl.[5] G10H *1/20, 7/00*
U.S. Cl. 84—609 **6 Claims**



1. A synthetic recording device in an automatic performance piano conducting an automatic performance in response to playback performance information read from memory means and, simultaneously, detecting keys operated by a performer from among keys provided in a keyboard and generating record performance information in accordance with a result of detection, and storing performance information obtained by synthesizing the record performance information and the playback performance information in the memory means, comprising:

key range setting means for setting, as a record area, a range of keys in which the record performance information is to be generated;

transposition means for transposing, when the playback performance information corresponds to a key within the range set by the key range setting means, the playback performance information by a predetermined amount of transposition and outputting the transposed playback performance information;

piano performance means for performing playback in response to the transposed playback performance information and detecting a state of operation of keys in the keyboard to provide key operation information;

selection means for selecting key operation information corresponding to a key in the record area from amont the key operation information provided by the piano performance means and outputting the selected information as the record performance information;

delay means for delaying the playback performance information by a predetermined period of time determined on the basis of dynamic characteristics of a string hammering section of the automatic performance piano; and

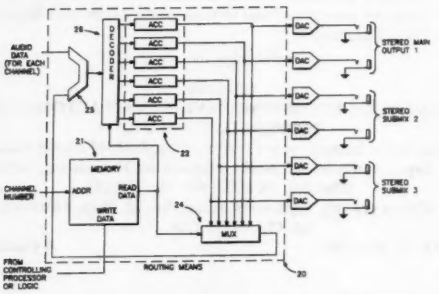
synthetic recording means for synthesizing the delayed playback performance information and the record performance information and providing the synthesized information to the memory means to be stored therein.

5,072,645

OUTPUT STAGE FOR A MULTITIMBRAL ELECTRONIC MUSICAL INSTRUMENT PROVIDING AUTOMATIC DETECTION OF THE USE OF SUBMIX OUTPUTS

David P. Rossum, Santa Cruz, Calif., assignor to E-mu Systems, Inc., Scotts Valley, Calif.

Filed Jan. 11, 1990, Ser. No. 462,690
Int. Cl.[5] G10H *5/00, 1/08*
U.S. Cl. 84—660 6 Claims



1. An output stage for a multitimbral musical instrument with monophonic stereophonic main and submix auxiliary outputs of musical notes comprising:

routing means for sending each musical note to one of said outputs,

detection means for detecting if a submix output is being utilized, and

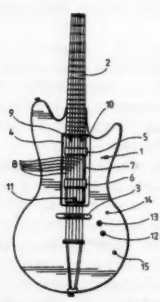
logic means that automatically causes said routing means to digitally send musical notes intended for the auxiliary output to said main output if said auxiliary output is not being utilized.

5,072,646

MICROPHONE ARRANGEMENT FOR STRINGED INSTRUMENTS, PARTICULARLY FOR AN ELECTRIC GUITAR

Utria Valkama, Hakkuritie 9, SF-90800 Oulu, Finland

Filed Oct. 17, 1990, Ser. No. 599,678
Claims priority, application Finland, Oct. 23, 1989, 895019; Apr. 3, 1990, 901679
Int. Cl.[5] G10H *3/18*
U.S. Cl. 84—726 11 Claims



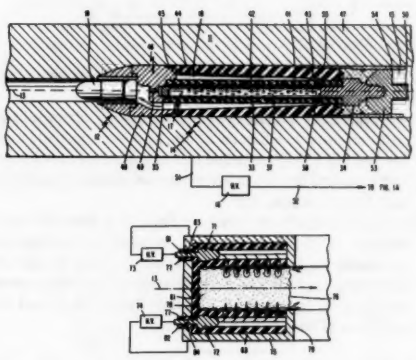
1. A microphone arrangement for stringed instruments, particularly for an electric guitar, comprising a body and at least one microphone with first and second poles to be attached to the body, the body being provided with slide rails functioning as guides for the microphone in such a manner that the microphone is displaceable in the longitudinal direction of the body, which enables the position of the microphone to be altered in a direction parallel to the strings of the stringed instrument, said body comprising a body plate with an electroconductive area, the slide rails being made of an electroconductive material and mounted on both sides of the body plate in such a manner that they are electrically insulated from said electroconductive area, and a flexible pressure joint being provided between the slide rail and the corresponding guide body in the microphone, said pressure joint enabling the microphone to be detachably mounted on the body plate and functioning as a bayonet connection between the microphone and the body plate, whereby the second pole of the microphone is, when attached to the body plate, in electric contact with said electroconductive area of the body plate, and the first pole of the microphone, which first pole is of opposite polarity from the second pole, is in electric contact with one of the slide rails.

5,072,647

HIGH-PRESSURE HAVING PLASMA FLOW TRANSVERSE TO PLASMA DISCHARGE PARTICULARLY FOR PROJECTILE ACCELERATION

Yeshayahu S. A. Goldstein, Gaithersburg; Derek A. Tidman, Silver Spring, both of Md.; Dennis W. Massey, Manassas, Va., and Joseph R. Greig, Greenbelt, Md., assignors to GT-Devices, Alexandria, Va.

Filed Feb. 10, 1989, Ser. No. 308,581
Int. Cl.[5] E41B *6/00*
U.S. Cl. 89—8 86 Claims



1. An electrothermal gun for accelerating a projectile in a bore of a barrel having a longitudinal axis comprising electric means for establishing a plasma discharge in the direction of the longitudinal axis in a structure confining the discharge, means for preventing the axial flow of fluid from the structure to the barrel, the electric means imparting sufficient energy to the plasma discharge to cause the discharge to have sufficient pressure to accelerate the projectile through the barrel bore, means for establishing a chamber wherein high pressure flows to the rear of the projectile while the projectile is in the bore and being accelerated through the bore, and means for establishing a flow path transverse to the bore from where the discharge occurs into the chamber for enabling gas derived in response to the discharge to flow transversely of the bore and the discharge from the structure into the chamber, the transverse flow path being substantially throughout the length of the plasma discharge.

5,072,648

CONTROL SYSTEM FOR A FLUID OPERATED JACK

Darren L. Krahn, Concord, and John E. Wible, Painesville, both of Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Jun. 4, 1990, Ser. No. 532,724
Int. Cl.[5] F15B *13/02;* F16D *31/02*
U.S. Cl. 91—52 15 Claims

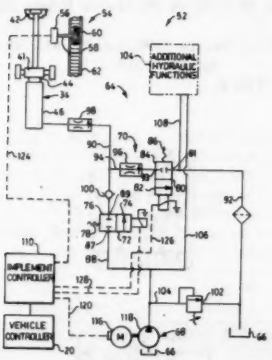
1. A control system for a fluid operated jack having a piston rod extensibly movable between first and second spaced apart

positions, a reservoir, and a source of pressurized fluid connected to and between said jack and and said reservoir and being adapted to deliver pressurized fluid flow from said reservoir to said jack; comprising:

sensing means for sensing the position of the piston rod and delivering a jack position signal in response to said jack being at a preselected location between said first and second positions;

a first control valve connected to and between said fluid source and jack and being shiftable between a first position at which pressurized fluid flow is deliverable from said source to said jack and a second position at which said pressurized fluid flow deliverable between said source and jack is blocked at the first control valve;

a second control valve connected to and between said jack and reservoir and being shiftable between a first position at which fluid flow is deliverable from said jack to said



reservoir and a second position at which fluid flow is blocked at said second control valve, said second control valve being adapted to pass the combined fluid flow of said jack and said source to said reservoir in response to the first and second control valves being at said first position;

restricting means for limiting the magnitude of fluid flow being delivered from the second control valve to the reservoir to a preselected maximum flow rate;

implement controller means for receiving the jack position signal and shifting said first control valve from the second position to the first position in response to said jack being at said preselected location between the first and second positions and said second control valve being at the first position, said second control valve and restricting means passing the combined fluid flow delivered from the source and jack to said reservoir and thereby reducing the speed of extensible movement of said jack.

5,072,649

DOUBLE ACTUATOR WITH BYPASS LINES FOR SYNCHRONIZED MOVEMENT

Aldo A. Laghi, 13 Meridian La., Ballston Lake, N.Y. 12019

Filed Jan. 7, 1991, Ser. No. 638,232
Int. Cl.[5] F01B *25/04*; F15B *7/00*
U.S. Cl. 91—171 **13 Claims**

1. An apparatus for pumping multiple components in a predetermined ratio, comprising:

first and second drive cylinders;

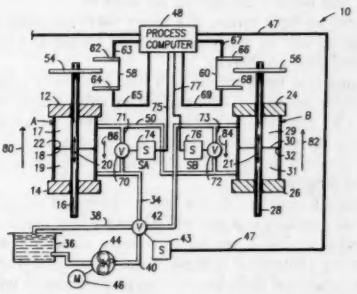
each of said drive cylinders slidably receiving a reciprocably mounted piston therein and each of said pistons being secured to a pump shaft that is received within its associated drive cylinder and which axially reciprocates with respect thereto, said drive cylinders being stationary;

an interconnecting conduit providing fluid communication between said drive cylinders, on opposite sides of said pistons;

a first and second branch supply line providing fluid communication between a source of hydraulic fluid and said first and second drive cylinders, respectively;

a first bypass line providing fluid communication between said interconnecting conduit and said first branch supply line;

a second bypass line providing fluid communication between said interconnecting conduit and said second branch supply line;



a first valving means disposed in said first bypass line;

a second valving means disposed in said second bypass line;

a third valving means disposed between said source of hydraulic fluid and said first and second branch supply lines; and

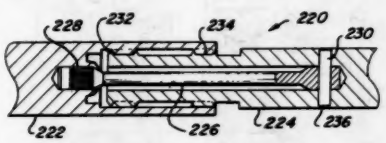
a process computer for controlling flow of hydraulic fluid through the apparatus by selectively opening and closing said first, second and third valves and by controlling a pump that pumps hydraulic fluid through the apparatus from said source of hydraulic fluid.

5,072,650

POWER STEERING SYSTEM WITH IMPROVED STABILITY

Edward H. Phillips, Rochester Hills, Mich., assignor to Techco Corporation, New York, N.Y.

Filed Aug. 3, 1990, Ser. No. 562,478
Int. Cl.[5] F15B *9/00*; B62D *5/00*
U.S. Cl. 91—375 A **15 Claims**



1. A power steering system for motor vehicles of the type used for steering dirigible wheels in response to a input torque applied to a steering wheel, comprising:

mechanical steering gear means for generating a mechanically derived steering force in response to said input torque;

a power cylinder coupled to said mechanical steering gear means for producing a hydraulically derived steering force for augmenting said mechanically derived steering force;

rotary control valve means in fluid communication with said power cylinder for generating the differential pressure applied to said power cylinder, said rotary control valve means having first and second valve members;

a first shaft coupled to said steering wheel;

a second shaft coupled to said first valve member;

means for coupling said second valve member of said rotary valve means to said mechanical steering gear means;

means for supplying fluid to said rotary control valve means;

first torsionally compliant means for elastically interconnecting said first and second valve members, said first torsionally compliant means having a first rotational stiffness characteristic; and

coupling means for coupling said first and second shafts, said coupling means having second torsionally compliant means for generating a second rotational stiffness characteristic which is less than said first rotational stiffness characteristic.

12. A method for improving the stability of a power steering system of the type used in motor vehicles for steering dirigible wheels, said method comprising the steps of:

applying an input torque to a rotary valve equipped power steering unit by applying a steering torque to a steering wheel coupled thereto;

applying said input torque to a first torsionally compliant member associated with said rotary valve power steering unit for generating a mechanically derived and a hydraulically derived steering force in response to said input torque to define a total steering force which is applied to said dirigible wheels;

coupling a coupling device intermediate said rotary valve power steering unit and said steering wheel, said coupling device having a second torsionally compliant member having a rotational stiffness characteristic that is less than the rotational stiffness characteristic associated with said first torsionally compliant member;

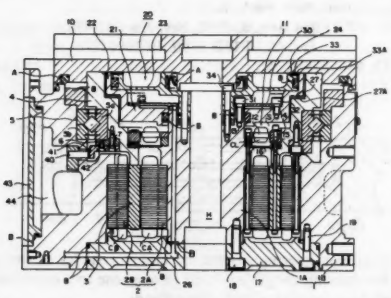
whereby said coupling device produces a reduction in the open loop gain value of said power steering system such that unity gain crossover is achieved with a reduced phase lag angle.

5,072,651

DIRECT DRIVE TYPE ROTATION DIVIDING TABLE

Kazuhiro Kagita, Tatebayashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 13, 1991, Ser. No. 668,975
Claims priority, application Japan, Mar. 19, 1990, 2-27895
Int. Cl.[5] F01B *7/02*; H02K *7/10*
U.S. Cl. 92—75 **4 Claims**



1. In a direct drive type rotation dividing table having a motor stator fixed to a housing, a motor rotor disposed in the housing opposing and coaxial with the stator, an output shaft extending from the motor rotor in an axial direction and rotatably supported by the housing through a bearing, a dividing table mounted to the output shaft, and a clamp mechanism for holding the dividing table at a stopped position, the improvement comprising:

the clamp mechanism including:

a cylinder slidably disposed in the housing for movement in an axial direction and having a radially extending plane portion and a friction surface adapted to contact and to move away from the output shaft;

an elastic member having one circumferential edge portion fixed to the housing and the other free circumferential edge portion connected to the cylinder to urge the friction surface of the cylinder away from the output shaft;

a piston disposed opposing to the plane portion of the cylinder and slidingly movable on an inner surface of the cylinder, the piston having a thin plane portion elastically deformable in the axial direction and having one circumferential side fixed to the housing and the other free circumferential side provided with a friction surface which contacts and moves away from the backside of the dividing table;

a pressure chamber provided between the opposing plane portions of the cylinder and the piston; and

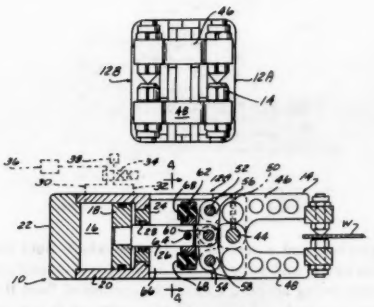
a fluid path for supplying pressurized fluid to the pressure chamber.

5,072,652

GRIPPING DEVICE HAVING IMPACT CUSHIONING MEANS

John A. Blatt, 22 Stratton Pl., Grosse Pointe Shores, Mich. 48236

Filed Nov. 16, 1990, Ser. No. 614,709
Int. Cl.[5] F01B *11/02*
U.S. Cl. 92—85.00 R **3 Claims**



1. A fluid pressure actuated gripper comprising:

a fluid pressure actuated cylinder-piston type motor including a piston chamber defining motor housing slidably receiving a piston for fluid pressure actuated forward and rearward movement within said chamber along a first axis, a mechanism housing, mounting means for fixedly and detachably mounting said mechanism housing on said motor housing, such that said mechanism housing extends forwardly from the front end of said motor housing, said mechanism housing having a pair of spaced opposed side walls defining opposite sides of a central passage extending through said mechanism housing from front to rear, a piston rod fixed to said piston and projecting forwardly through the front end wall of said motor housing in sliding sealed relationship therewith to a front end forwardly and rearwardly movable within said central passage, a pivot pin detachably mounted at its opposite ends in said side walls of said mechanism housing and extending across said central passage in a direction normal to said first axis, gripper jaw means pivotally mounted on said pivot pin, link means coupling said jaw means to said piston rod for pivoting said jaw means to a closed position in response to a forward movement of said rod and for pivoting said jaw means to an open position in response to a rearward movement of said rod, a carrier fixedly mounted on said rod forwardly of said front end wall, and resilient bumper means detachably mounted on said carrier and projecting rearwardly from said carrier and engageable with said front end wall to define a resiliently cushioned end limit to rearward movement of said piston within said piston chamber, said mechanism housing including two separable housing elements, one of said side walls constituting a

portion of one of said elements and the other of said side walls constituting a portion of the other of said elements.

5,072,653

PISTON BIASED TO ONE SIDE TO COVER RING GAP

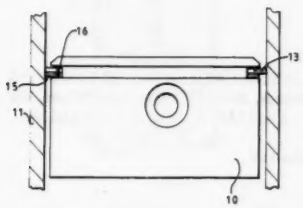
Bryan N. V. Parsons, Stoney Station, United Kingdom, assignor to Jaguar Cars Limited, England

Filed Jul. 11, 1989, Ser. No. 378,060

Claims priority, application United Kingdom, Jul. 16, 1988, 8816983

Int. Cl.[5] F01B *31/00*; F16J *1/14*

U.S. Cl. 92—126 6 Claims



1. A piston for a reciprocating machine including a split piston ring which is located in a circumferential groove in the cylindrical wall of the piston, the piston being adapted to be located in a cylindrical bore so that the piston ring sealingly engages the bore with a gap between its ends, said gap being fully underlaid and sealed by a contiguous unbroken annular supporting surface, means being provided to maintain the ends of the piston ring in fully underlaid engagement with the supporting surface, and

means to bias the piston towards one side of the cylinder bore on both the upstroke and downstroke of the piston, the gap and the piston ring being located against one side of the cylinder bore so that it is compressed fully into the circumferential groove and is sealed by engagement with a wall defining the circumferential groove.

5,072,654

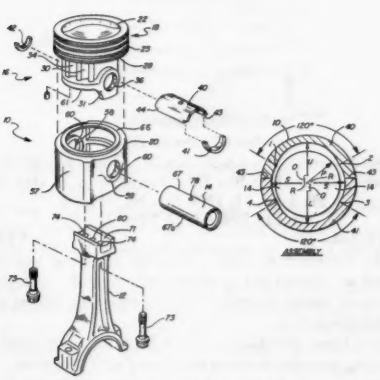
PISTON AND BEARING ASSEMBLIES

James W. MacGregor, Ann Arbor, Mich., assignor to Detroit Diesel Corporation, Detroit, Mich.

Filed Jan. 18, 1990, Ser. No. 467,136

Int. Cl.[5] F01B *31/10*

U.S. Cl. 92—157 9 Claims



1. A crosshead piston assembly comprising: a cylindrical piston pin secured to an upwardly extending part cylindrical lower saddle section of a connecting rod, a skirt member having an outer wall with a pair of oppositely disposed cylindrical piston pin receiving openings through said wall, said piston pin extending from said lower saddle section into said wall openings and supporting said skirt for oscillating motion about said piston pin, a head member having a crown section connected with a peripherally depending ring belt section above said skirt member and having a piston pin connecting section internally depending from said crown section and extending within said skirt member, said piston pin connecting section including a pair of oppositely disposed downwardly extending ears defining oppositely disposed pin receiving cylindrical openings, said ears being interconnected by a downwardly opening part cylindrical upper saddle section extending between said ears, the improvement comprising a three-piece insert bearing for insertion in the ear openings and having a part cylindrical upper insert bearing extending from ear to ear, a part cylindrical lower insert bearing at each end of the upper insert bearing and each forming a cylinder with the upper insert bearing when assembled, a space between said cylinders to receive the upper end of said connecting rod, the outer surfaces of said insert bearings, the inner surfaces of said saddle sections, and said openings in said skirt and piston members all having a common axis and a common radius which is slightly larger than the radius of the piston pin to enable its insertion in the various openings and its bearing against them and said saddle sections, the interior of each cylinder formed by said insert bearings being defined by internal radii which are equal to the radius of said piston pin and offset in up and down direction from said axis to permit assembly of the piston pin and allow it to move slightly in up and down direction relative to the piston head member, said interior of said insert bearings being further defined by a space on each side of said piston pin in order to permit assembly, means for interconnecting said insert bearings to said head member to prevent relative rotation therebetween, means for preventing sideways movement of said insert bearings, and means for supplying oil under pressure between said piston pin and the interiors of said insert bearings during operation of the engine.

5,072,655

PISTONS FOR AXIAL PISTON MACHINES

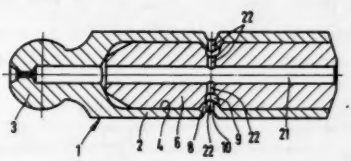
Bernhard Adler, Thalfingen, Fed. Rep. of Germany, assignor to Hydromatik GmbH, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 307,262

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804424

Int. Cl.[5] F04B *21/04, 1/12*; F16J *1/00*

U.S. Cl. 92—160 22 Claims



1. A piston for an axial piston machine, comprising:

a piston body forming an axial cavity, and having a given specific gravity; and

a filler material inserted into and at least partially filling said cavity, and having a specific gravity less than said given specific gravity;

the filler material including

i) inner and outer opposite axial ends,

ii) an annular surface extending between said ends, and

iii) a recess extending inward from said annular surface at a location between said axial ends;

the piston body including

i) a tubular sidewall,

ii) a radially extending surface extending inward from the sidewall, and

iii) an indented section connected to and radially extending inward from the sidewall, the indented section being

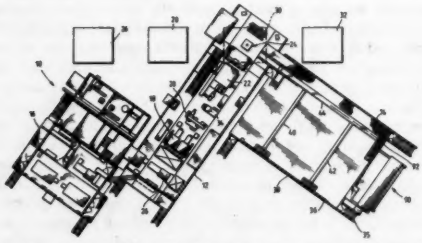
pressed into the recess of the filler material to fit in said recess in pressure engagement against filler material to hold said filler material axially in place in the cavity of the piston body.

5,072,656

METHOD AND APPARATUS FOR CONTROLLING THE TRANSFER OF TUBULAR MEMBERS INTO A SHELTER

David A. Mochizuki, Anchorage, Ak., assignor to Nabors Industries, Inc., Houston, Tex.

Filed Feb. 12, 1991, Ser. No. 654,237
Int. Cl.[5] F24F *1/02*
U.S. Cl. 454—255 19 Claims



1. A method for controlling the temperature within a pipe shelter, comprising the steps of:

providing an opening in an outer wall of said pipe shelter for delivering material therethrough;

providing a high-speed spool or window-shade style door in said opening to substantially resist the exchange of air within said pipe shelter with air outside said pipe shelter;

pressurizing the interior of said pipe shelter with heated air to a level exceeding outside atmospheric pressure;

spooling said door open at high-speed;

delivering said material through said opening; and

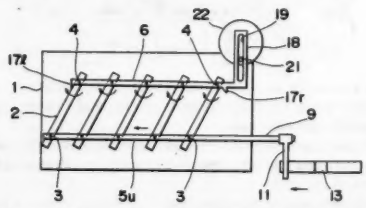
spooling said door closed at high-speed.

5,072,657

BLOWING LOUVER WITH SWINGING FINS FOR AIR CONDITIONERS

Toshifumi Sakai, Hiroshima, Japan, assignor to Daikyo Co., Ltd., Hiroshima, Japan

Filed Feb. 28, 1990, Ser. No. 485,316
Claims priority, application Japan, Feb. 28, 1989, 1-47105; Feb. 28, 1989, 1-47106; Jul. 12, 1989, 1-82432[U]
Int. Cl.[5] F24F *13/15*
U.S. Cl. 454—153 8 Claims



8. A blowing louver for automotive air conditioners, comprising:

a plurality of fins for shifting the direction of air, each of which having first and second parallel pivotal axes;

a first link member for connecting the first pivotal axes of a predetermined number of said fins in common, permitting the fins to be pivoted about the second axes;

an operation means for moving the first link member manually in a length-wise direction thereof;

a second link member for connecting the second pivotal axes of a predetermined number of said fins in common, permitting the fins to be pivoted about the first axes; and

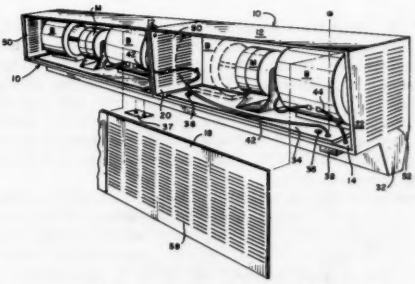
a driving means for driving the second link member reciprocally in a length-wise direction thereof, said driving means being provided with means for stopping the second link member at a predetermined position when said driving means is switched off, the driving means being capable of being switched off independently of the air conditioner.

5,072,658

INSTALLATION OF AIR CURTAINS

Gerald I. Bogage, 2000 NW. 95th Ave., Miami, Fla. 33172

Filed May 3, 1991, Ser. No. 695,391
Int. Cl.[5] F24F *9/00*
U.S. Cl. 454—188 9 Claims



1. An installation for an air curtain comprising a hollowlike cabinet adapted to house motor and blower means, each cabinet having a pair of opposed panels and an access wall extending between said panels, louvers in said access wall and in said panels for air flow into said cabinet, each panel having a plurality of knockout discs spaced from each other and adapted to be displaced and receive fastening bolts whereby said cabinet may be fastened to an adjacent cabinet.

5,072,659

HEATED DOOR

Michael J. Jorde, 909 S. 8th St., Box 237, Cando, Ind. 58324, and Mark A. Brehm, P.O. Box 237, Churchs Ferry, N. Dak. 58325

Filed Jul. 11, 1990, Ser. No. 552,736
Int. Cl.[5] E04H *7/22;* F24F *13/10*
U.S. Cl. 454—174 9 Claims

1. In combination with a building requiring ventilation through an opening in one of the walls thereof, comprising,

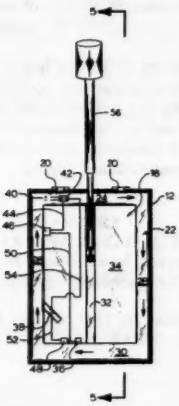
a support means mounted in said opening and having upper and lower ends,

a door means pivotally mounted in said support means and being movable between closed and open positions,

means operatively secured to said door means for moving said door means between its said open and closed positions,

said door means including a hollow tubular, peripheral frame means which is received by said support means,

a fluid in said tubular frame means,
said frame means being fluidly sealed to maintain said fluid therein,



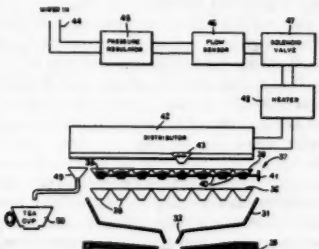
heating means in said tubular frame means for heating said fluid therein for preventing said door means from becoming frozen in said support means,
and thermostat means for controlling said heating means.

5,072,660

AUTOMATIC INFUSION-BEVERAGE APPARATUS

Edward Helbling, 1 Janet La., Commack, N.Y. 11725

Division of Ser. No. 389,424, Aug. 3, 1989, Pat. No. 4,967,648, which is a continuation-in-part of Ser. No. 218,107, Jul. 12, 1988, Pat. No. 4,858,523. This application May 2, 1990, Ser. No. 517,943
Int. Cl.[5] A47J *31/34*
U.S. Cl. 99—280 **11 Claims**



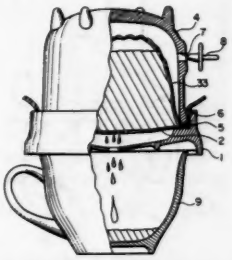
1. A coffee-making machine, comprising:
a source of hot water;
brewing means connectable to said source and having at least one brewing compartment and adapted to receive a quantity of ground coffee brewable to form a coffee beverage;
a plurality of receptacles adapted to receive coffee beverage;
electrically operable distributor means interposed between said brewing means and said receptacles for selectively connecting said brewing means with a respective one of said receptacles to deliver the coffee beverage to said receptacles; and
electrical control circuit means operatively connected to said distributor means for selectively connecting said distributor means with said receptacles.

5,072,661

APPARATUS AND METHOD FOR OBTAINING HOT BEVERAGE EXTRACT LIQUID

Takashi Kondo, 6-4,Oaza Furugo, Oita City, Oita Prefecture, Japan 870

Filed Feb. 16, 1990, Ser. No. 481,052
Claims priority, application Japan, Feb. 22, 1989, 1-42074
Int. Cl.[5] A47J *31/16;* A23F *5/00, 3/34*
U.S. Cl. 99—296 **8 Claims**



1. An apparatus for obtaining a hot beverage extract liquid by filtration, comprising:
a vessel body for containing a hot beverage forming material and hot water, said vessel body having a first end with an opening formed therein, a second closed end, and an air vent located near said second end;
means, comprising a stopper, for selectively sealing said air vent to make it airtight;
means, comprising a bag disposed in said vessel body, for simultaneously holding the hot beverage forming material and hot water, said bag having a closed end and an open end with a peripheral portion, said peripheral portion being foldable outwardly at said opening in said first end of said vessel body;
a filter paper for covering said opening in said first end of said vessel body, said filter paper having a peripheral portion adapted to overlie said peripheral portion of said open end of said bag;
a tray having first and second surfaces, means on said first surface for mounting a hot beverage cup thereto, and means on said second surface for receiving said first end of said vessel body with said peripheral portions of said filter paper and said bag being disposed between said first end of said vessel body and said second surface of said tray; and
means, on said tray and said vessel body, for sealingly attaching said first end of said vessel body with said second surface of said tray to form an airtight seal therebetween.

5,072,662

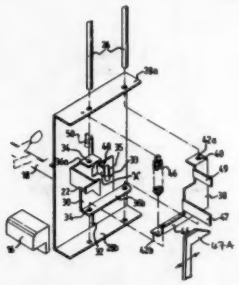
ELECTRIC TOASTER

Kit C. Yip, New Territories, Hong Kong, assignor to G. E. W. Corporation Limited, Kowloon, Hong Kong

Filed Oct. 18, 1990, Ser. No. 600,760
Claims priority, application United Kingdom, Oct. 20, 1989, 8923647
Int. Cl.[5] A47J *37/08*
U.S. Cl. 99—327 **5 Claims**

1. An electric toaster having a generally closed housing with an elongate top opening for insertion of an item to be toasted; a vertically movable elongate carriage in the housing for supporting the item in three discrete operative positions corresponding to a lowermost toasting position, a first toast-removal position and a second toast-removal position higher than said first position, a vertical slot in the housing; a carriage support bracket fixed at one end of the carriage slidably mounted on vertical rails, having an operating arm extending through the vertical slot and first inter-engaging means fixed on the bracket; a second bracket slidably mounted on the rails and vertically movable relative to the carriage support bracket,

having a latching arm for cooperating with a hold-down latch and second interengaging means fixed to the second bracket; a spring to bias the second bracket upwards towards an uppermost position of the second bracket corresponding to the first toast-removal position, in which the first and second interengaging means abut one another to move the support bracket and second bracket simultaneously when the operating arm is



moved downwards towards the toasting position to cause the latching arm to engage the hold-down latch, and abut one another when the second bracket is released by the hold-down latch and is moved upwards by the spring to its uppermost position, and in which the support bracket is free to move upwards relative to the second bracket when the arm is moved to raise the support bracket from the first toast-removal position to the second toast-removal position.

5,072,663

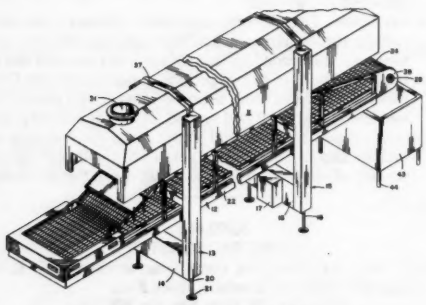
SHRIMP COOKING APPARATUS

Roy Ellis-Brown, New Smyrna Beach, Fla., assignor to Seafood Equipment Development Corporation, Miami, Fla.

Filed Apr. 26, 1991, Ser. No. 692,290

Int. Cl.[5] A23L *3/00*

U.S. Cl. 99—331 **22 Claims**



1. A shrimp cooking apparatus comprising:

a frame including a plurality of upright members;

a motor driven endless belt conveyor having a porous endless belt supported on said frame;

a housing covering a portion of said porous endless belt and supported on said frame, said housing having an entrance thereinto and an exit therefrom and said housing being formed from spaced inner and outer layers of metal having a predetermined layer of insulation therebetween;

a housing lift mechanism attached to said plurality of frame upright members and to said housing for lifting said housing relative to said plurality of frame upright members to thereby gain access inside said housing;

a steam feed pipe connected to a source of steam and connected to a plurality of steam nozzles for directing steam into said housing;

a plurality of solenoid valves, each valve being operatively connected to open and close one said steam feed pipe nozzle to thereby control the feeding of steam into said housing;

control system connected to each of said plurality of solenoid valves for controlling the operation of said valves; and

a plurality of sensors for sensing heat in said housing, each said sensor being operatively connected to said control system whereby said control system can control the flow of steam into said housing responsive to said plurality of sensors sensed conditions and whereby shrimp can be cooked to a predetermined degree.

5,072,664

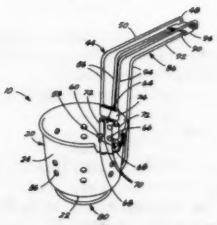
SHELL MAKER APPARATUS

Lawrence J. Tienor, and John L. Shope, Jr., both of Eau Claire, Wis., assignors to National Presto Industries, Inc., Eau Claire, Wis.

Filed May 10, 1990, Ser. No. 522,155

Int. Cl.[5] A47J *37/12*

U.S. Cl. 99—353 **15 Claims**



1. An apparatus for use in forming a flexible tortilla into a rigid bowl-shaped shell during submersive cooking in oil; the tortilla having a center portion and an outer periphery surrounding the center portion; said apparatus comprising:

(a) a basket having a base portion and a side wall portion extending generally upwards from said base portion, said side wall portion having an upward dimension at least one-third as great as a diameter of said base portion, said side wall portion further having a porosity no greater than one-half of a total area of said side wall portion;

(b) a basket handle having a first end connected to said basket and extending from said basket to a distal end; and

(c) support means for pressing the center portion of the tortilla against said base portion, said support means permitting the oil to fold at least a portion of the outer periphery of the tortilla extending beyond said base portion from at least a position in a plane defined by said base portion to a position adjacent said side wall portion during submersive cooking while the center portion of the tortilla is pressed against said base portion of said basket, said support means comprising:

(i) a support member including a planar ring portion, said planar ring portion having an open interior to the passage of oil, said planar ring portion having an outer perimeter defining an area less than or equal to an area defined by the outer perimeter of said base portion of said basket;

(ii) a support handle having a first end connected to said support member and extending from said support member to a distal end; and

(iii) means for pivotally connecting said distal end of said basket handle to said distal end of said support member, said basket and said support member being pivotally movable to a first position for pressing the center portion of the tortilla between said base portion of said basket and said planar portion of said support member, said basket and said support member being pivotally

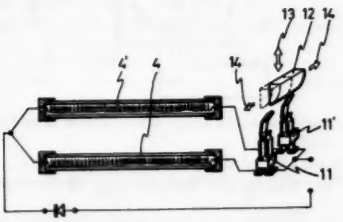
movable to a second spaced apart position for loading and unloading the tortilla from said apparatus.

5,072,665

TOASTER

Miguel Lababia Del Fresno, San Sebastian, Spain, assignor to Oficina de Investigacion Agrupada, Spain

Filed Jun. 9, 1989, Ser. No. 364,196
Claims priority, application Spain, Jun. 14, 1988, 8801905
Int. Cl.[5] A47J *37/08*; H01H *3/14*
U.S. Cl. 99—391 **2 Claims**



1. In an improved toaster having a framework with two heating resistors the toaster having grids protecting each resistor from contact with the item to be toasted, the grids defining the sides of a toasting receptacle wherein the item to be toasted is placed for toasting, the toaster having an ejecting plate which defines the bottom of the toasting receptacle, the toaster having an external control lever which controls the ejecting plate, the ejecting plate being capable of being locked in a toasting position when the external control lever is in its toasting position, the ejecting plate being releasable for automatic ejection of the toasted item, the toaster having an adjusting temporizer which controls the releasing of the ejecting plate, the improvement comprising:

(a) the toaster having a diode capable of energizing the resistors;

(b) the resistors being connected in parallel and energized through the diode, the resistors having corresponding independent contactors which activate the resistors; and

(c) a wedge which is vertically movable from a non-contact position to a contact position, the wedge in the contact position contacting the contactors, the wedge also being transversely movable in order to selectively contact only one or both of the contactors and thus selectively activating only one or both of the corresponding resistors.

5,072,666

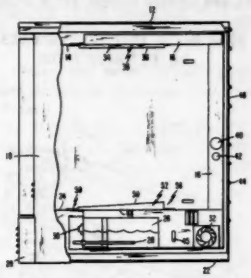
DOUGH PROOFING CHAMBER

Jeffrey Hullstrung, Underhill, Vt., assignor to G.S. Blodgett Co., Inc., Burlington, Vt.

Filed Feb. 22, 1991, Ser. No. 658,912
Int. Cl.[5] A23L *1/00*; A21C *13/00*; H05B *1/00*
U.S. Cl. 99—468 **7 Claims**

1. A dough proofing chamber comprising:

a cabinet having a top and a ceiling spaced below the top said ceiling defining an outlet port, a base and a floor spaced above said base said floor defining an inlet port, and upstanding sides; an evaporator and an air heater disposed on the base below the inlet port; duct means extending between the outlet port and the space between said base and floor for placing the interior of said cabinet in communication with the space between the base and floor; circulating means for withdrawing air through the outlet port and duct means, circulating it through the space between said floor and base, over said evaporator and heatcr and through the inlet port; an upper diverter plate covering the outlet port and spaced below said port; and a rectangular lower diverter plate covering the inlet port and spaced above said floor said lower plate having two, opposed open sides, each open side defining with the floor a nozzle having a continuous decreasing opening



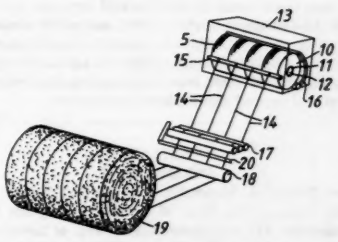
directed at an adjacent side of said cabinet along its length from one side of the plate to the opposite side.

5,072,667

MEANS AND METHOD FOR BALING STRAW, HAY AND LIKE MATERIAL

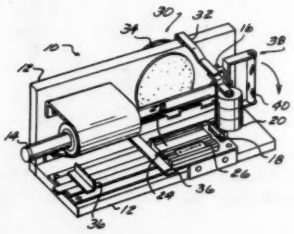
John K. Yeardley, London, England, assignor to Bridon PLC, Doncaster, England

Continuation of Ser. No. 470,411, Jan. 29, 1990, abandoned, which is a continuation of Ser. No. 365,120, Jun. 12, 1989, abandoned, which is a continuation of Ser. No. 227,668, Aug. 2, 1988, abandoned. This application Oct. 30, 1990, Ser. No. 605,006
Int. Cl.[5] B65B *13/02*
U.S. Cl. 100—3 **5 Claims**



2. A method of securing a cylindrical bale of straw, and hay like material comprising the steps of, inserting a baler twine package onto a support means for axial rotation, wherein said baler twine package includes a plurality of separate lengths of twine wound into separate spools co-axially on a common carrier, said wound lengths of twine being in close side-by-side engagement with the sides of adjacent wound lengths of twine being in contacting relation; rotating the cylindrical bale of material axially; always withdrawing the ends of twine in the same amount simultaneously from each of said spools on the common carrier at positions spaced axially apart along the baler twine package to rotate the baler twine package as a unit simultaneously with and in parallel relation with the rotating bale; and always simultaneously wrapping said twine from said plurality of spools on the rotating baler twine package around a cylindrical bale at corresponding positions spaced axially apart along said bale while simultaneously rotating the cylindrical bale to hold the bale together.

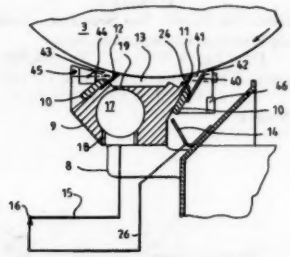
5,072,668
PRINTING APPARATUS
Raymond J. Cavallaro, 1776 Brookview Cir., Bloomfield Hills, Mich. 48013, and Edward Ferrari, 317 E. 8 Mile, Hazel Park, Mich. 48030
Filed Apr. 4, 1991, Ser. No. 680,357
Int. Cl.[5] B41F *17/08*
U.S. Cl. 101—39 20 Claims



1. A printing apparatus for forming an ink image on an article, the printing apparatus comprising:
ink storage means for storing a supply of ink;
image carrier means for supporting a selected image to be imprinted on a selected article;
frame means for supporting said ink storage means and said image carrier means;
ink transfer means for transferring ink from said ink storage means to said selected image supported by said image carrier means;
pressure applying means for urging said selected article into contact with said selected image supported by said image carrier means; and
shaft means for supporting said ink transfer means and said pressure applying means for rotational displacement between first and second angular positions and for reciprocal displacement while in said first and second angular positions between first and second end limits of movement, such that when in said first angular position, said ink transfer means is engageable with said ink storage means as said shaft means is reciprocated between said first and second end limits of movement, and when in said second angular position, said ink transfer means is engageable with said selected image supported by said image carrier means as said shaft means is reciprocated between said first and second end limits of movement.

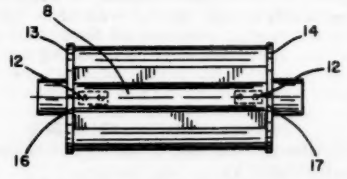
5,072,669
INKING UNIT
Norbert Weisbrod, Hessheim, and Norbert Köbler, Beindersheim, both of Fed. Rep. of Germany, assignors to Albert-Frankenthal AG, Frankenthal, Fed. Rep. of Germany
Continuation of Ser. No. 290,151, Dec. 27, 1988, abandoned.
This application Feb. 21, 1991, Ser. No. 659,459
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800119
Int. Cl.[5] B41F *31/04, 31/06;* B41L *27/10*
U.S. Cl. 101—142 12 Claims

1. A printing apparatus, comprising:
an offset printing press having an inking unit as a part of said offset printing press, said inking unit including:
a pitted roll;
a first doctor blade and a second doctor blade, said doctor blades being arranged to cooperate with the periphery of said pitted roll and which are mutually offset about such periphery, said doctor blades defining an ink chamber into which said pitted roll is arranged to extend, said first doctor blade being an upstream closing blade and acting as means for producing a substantially clean, or blank, surface;
an ink forechamber being defined outside said first doctor blade upstream from said ink chamber into which forechamber said pitted roll extends, wherein said first doctor blade serves to separate said ink forechamber from said ink chamber and wherein at least one transfer



port is provided adjacent to a portion of said first doctor blade; and,
means adapted to supply said ink chamber through at least one transfer port leading to said ink forechamber.

5,072,670
GAP COVER FOR BLANKET CYLINDERS IN SHEET-FED OFFSET ROTARY PRESSES
Marco Bergmann, Offenbach am Main, and Herbert Rebel, Rodgau, both of Fed. Rep. of Germany, assignors to MAN Roland Druckmaschinen AG, Fed. Rep. of Germany
Filed Aug. 30, 1990, Ser. No. 575,067
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1989, 3928640
Int. Cl.[5] B41F *13/42*
U.S. Cl. 101—415.1 5 Claims



1. A blanket cylinder for sheet-fed rotary printing presses comprising in combination, an elongated cylinder including end walls at each end of the cylinder and a wide gap extending parallel to the central axis of the cylinder having a lower base portion, a pair of clamping spindles disposed in said gap, a blanket adapted to cover said cylinder having ends secured by said clamping spindles in said gap, an elongated cover rail disposed in said gap along the entire longitudinal length thereof up to said end walls of the cylinder, said cover rail having a substantially mushroom-shaped cross-section including a rounded head portion and a depending stem portion, said rail head portion having a width formed approximately equal to the distance between the central axes of said clamping spindles and being adapted to bear against said spindles in said gap with said blanket disposed therebetween, means for rigidly securing said cover rail to said base of the gap, and means for sealing between said end walls of the cylinder and the adjacent end surfaces of said cover rail.

5,072,671

SYSTEM AND METHOD TO APPLY A PRINTING IMAGE ON A PRINTING MACHINE CYLINDER IN ACCORDANCE WITH ELECTRONICALLY FURNISHED IMAGE INFORMATION

Josef Schneider, Munich; Hartmut Fuhrmann, Karlsfeld, and Ingo Köbler, Anhausen, all of Fed. Rep. of Germany, assignors to MAN Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

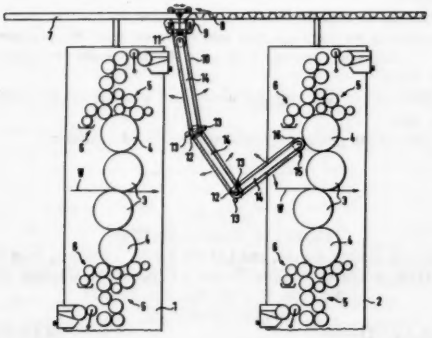
Filed Nov. 1, 1989, Ser. No. 430,511

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1988, 3837897; Nov. 9, 1988, 3837898; Nov. 9, 1988, 3837941; Nov. 9, 1988, 3837978; Nov. 9, 1988, 3837979

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.[5] B41C *1/10, 1/04, 1/05, 1/18*

U.S. Cl. 101—467 57 Claims



1. A method of applying a printed image on a printing machine form (**4, 18**) of a printing machine, in accordance with image information, provided by an electronic control unit (**22**),

wherein said printing machine form comprises a surface element having ink applying surface portions and non-inking surface portions for subsequent transfer of printing information unto a substrate (**W, 1103**) receiving said printed information,

comprising the steps of

passing a transfer tape (**10, 19, 415, 1107, 1214, 1513, 1706**) past a recording head (**9, 17, 414, 1507, 1709**) controlled by said control unit (**22**),

wherein the transfer tape has a substance on a surface thereof which is subject to change of characteristics under influence of energy applied thereto by said recording head, and wherein said change in characteristics affects the affinity of, respectively, water and printing ink of the surface of said transfer tape;

applying energy to the recording head in accordance with the image information provided by said electronic control unit (**22**) in line form, to apply to said transfer tape a pattern of changed characteristics representative of said image information;

passing said transfer tape with said image information thereon to a reproducing means (**16, 25, 424, 1104, 1105, 1926**);

arranging said reproducing means for direct operative association with said printing machine form (**4, 18**), with said transfer tape interposed between the reproducing means and the printing machine form and

applying energy to said reproducing means to transfer the substance with its characteristics controlled in accordance with the image information from said transfer tape onto said printing machine form (**4, 18**).

5,072,672

COMPOSITE MATERIALS WITH LUBRICATING PROPERTIES, PROCESS FOR THEIR MANUFACTURE AND ANTIEROSIVE COMPONENTS FOR A BARREL WEAPON SYSTEM WHICH CONSISTS OF THESE MATERIALS

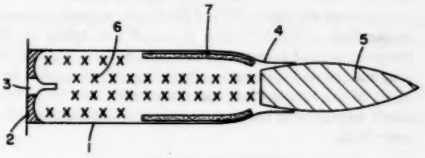
Alain Lefumeux, Orsay, and Serge Raynal, Draveil, both of France, assignors to Societe Nationale Des Poudres et Explosifs, Paris, France

Division of Ser. No. 280,126, Dec. 5, 1988, Pat. No. 4,994,203. This application Nov. 1, 1990, Ser. No. 607,580

Claims priority, application France, Dec. 18, 1987, 87 17670

Int. Cl.[5] F42B *5/24*

U.S. Cl. 102—435 3 Claims



1. An ammunition for a barrel weapon comprising a shell (**1**), said shell having a base (**2**) crimped to one first end of said shell, said base carrying a primer (**3**), said shell having a constriction (**4**) at the end opposite to said first end, a propellant powder being placed in said shell, a projectile being crimped in said construction, said shell having an inner surface, an antierosive sleeve surrounding said inner surface in the portion close to said projectile, said sleeve consisting essentially of a solid matrix of polystyrene or polymethyl methacrylate and containing 20–85% of droplets of a liquid silicone oil dispersed and occluded in said matrix of size between 5 and 45 microns.

5,072,673

BOGIE WITH A DEFORMABLE UNDERFRAME INCLUDING AN OBLIQUE FACED FRICTION WEDGE AND DIRECT ENGAGEMENT BETWEEN BOLSTER AND SIDE-FRAME

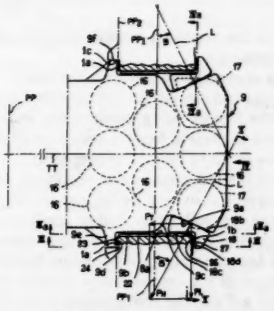
Jean Lienard, Ferriere la Petite, France, assignor to Usines et Acieries de Sambre et Meuse, Feignies, France

Filed Mar. 19, 1990, Ser. No. 495,591

Claims priority, application France, Mar. 24, 1989, 89 03902

Int. Cl.[5] B61F *5/50*

U.S. Cl. 105—198.2 9 Claims



1. A bogie comprising two longitudinal elements, between which extend axles (**3**) and at least one transverse element, the transverse element (**11**) forming, at each of its ends (**9**) together with one of the longitudinal elements (**1**) and a wedge (**18**), a deformable link in which:

a lateral reference face (**1a**) belonging to the longitudinal element (**1**) is frictionally engageable with a mating reference face (**9d**) belonging to the transverse element (**11**),

said lateral and mating reference faces being transverse to the longitudinal direction of the transverse element;

under the action of elastic means (17) urging the wedge upwardly, a first oblique face (18*b*) belonging to the wedge, bears against a corresponding second oblique face (9*a*) belonging to one (11) of the longitudinal (1) and transverse (11) elements of the link, wherein a vertical plane (L) orthogonally intersecting the first and the second oblique faces (18*b*, 9*a*) forms an angle (B) with a longitudinal midplane (PP) of the bogie, whereby:

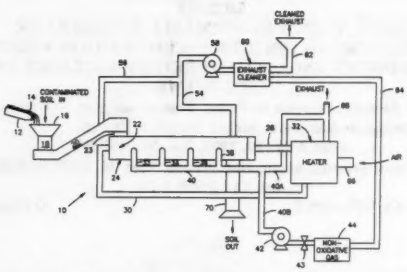
the wedge is urged against the other of said longitudinal and transverse elements in a frictional engagement in which two vertical friction faces of the wedge, one of which is transverse to said longitudinal midplane (PP) of the bogie and the other of which is substantially parallel to said longitudinal midplane (PP) of the bogie, engage two corresponding vertical friction faces of said other of the longitudinal and transverse elements, and said one of the longitudinal and transverse elements is urged against said other of the longitudinal and transverse elements in frictional engagement between said lateral and mating reference faces.

5,072,674

APPARATUS AND METHOD FOR LOW TEMPERATURE THERMAL STRIPPING OF VOLATILE ORGANIC COMPOUNDS FROM SOIL WITH NON-OXIDATIVE CROSS-SWEEP GASES

John Noland, West Chester, and Luis A. Velazquez, Downingtown, both of Pa., assignors to Roy F. Weston, Inc., West Chester, Pa.

Filed Dec. 13, 1990, Ser. No. 626,726
Int. Cl.[5] F23G *5/00*
U.S. Cl. 110—346 **23 Claims**



1. A method for removing volatile organic contaminants from soil comprising:

a) removing contaminated soil from the earth;

b) transporting and placing the contaminated soil into a soil hopper, the hopper being substantially sealed from the atmosphere to prevent fugitive emissions of the contaminants from escaping into the atmosphere;

c) conveying the soil under sealed conditions into a heated vapor stripping conveyor having moving flights;

d) conveying the soil under sealed conditions along the vapor stripping conveyor and in close contact with the flights to heat the soil to a temperature below the boiling temperatures of the contaminants, thereby causing moisture in the soil and the contaminants to be stripped from the soil;

e) streaming non-oxidizing gases having a greater than ambient temperature across the surface of the soil to carry the contaminants and moisture across and away from the soil; and

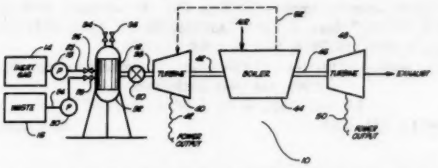
f) maintaining the rate of flow and temperature of the gases to prevent undue surface drying of the soil as the soil passes through the conveyor.

5,072,675

APPARATUS AND METHOD FOR THE DESTRUCTION OF WASTE

Benjamin P. Fowler, 805 S. Country Club Dr., LaPorte, Tex. 77571

Filed Apr. 15, 1991, Ser. No. 685,146
Int. Cl.[5] F23G *5/12*
U.S. Cl. 110—346 **20 Claims**



1. A process for the destruction of waste comprising the steps of:

passing an organic waste into a chamber;

pumping an inert gas into said chamber until the pressure within said chamber is at least 10,000 pounds per square inch;

dissociating said organic waste into gaseous constituents; and

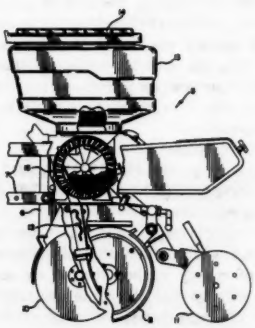
passing the gaseous constituents from said chamber.

5,072,676

HOPPERS FOR PLANTERS

Larry J. Pingry, Celina, and LaVern Kunk, Coldwater, both of Ohio, assignors to Allied Products Corporation, Chicago, Ill.

Filed Nov. 16, 1990, Ser. No. 614,911
Int. Cl.[5] A01C *7/20*
U.S. Cl. 111—63 **24 Claims**



13. A hopper and hopper lid combination for containing dry free-flowing particulate material, said hopper having a generally rectangular top opening defined by a generally rectangular rim having vertically spaced top and bottom walls interconnected by a side wall, and,

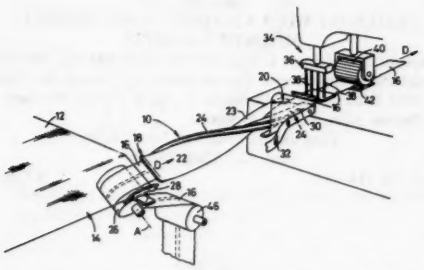
a closure lid horizontally slidable onto and off of said top opening and comprising a U-shaped side wall depending from the lid top, said side position having an integral inturned flange vertically spaced from the lid top a distance whereby in the closed position of said lid on said hopper rim said lid grips said hopper rim, said inturned flange and said hopper rim bottom wall having inter-locking formations which become engaged and provide a retention means for maintaining said lid and rim in said closed position whereby said lid resists dislodgement from said top opening.

5,072,677

ENCLOSING ELASTIC IN A FABRIC

Peter W. Easom, Melton Mowbray, and Stephen P. Bridle, West Bridgford, both of United Kingdom, assignors to Automatic Braiding Limited, Melton Mowbray, United Kingdom

Filed Nov. 15, 1990, Ser. No. 614,146
Int. Cl.[5] D05B *23/00*
U.S. Cl. 112—121.27 13 Claims



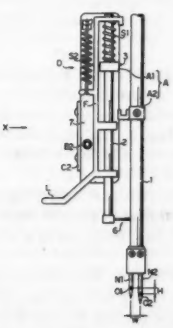
1. Apparatus suitable for use in securing and enclosing an extensible elastic band within a hem tunnel formed in a length of garment fabric comprising a fabric folding device for forming fabric into said hem tunnel to present the fabric automatically folded about said band on a substantially planar path to a mechanism for withdrawing said band and fabric from a substantially planar exit zone of the folding device and for securing said band in said hem tunnel, wherein the fabric folding device comprises a substantially planar entry zone inclined at an angle relative to said exit zone wherein said fabric and said band are introduced into the folding device in a direction of feed therethrough, and wherein the apparatus further comprises a guide roll wherein said band is guided to said folding device, mounted for rotation about an axis substantially parallel with the plane of the entry zone but at substantially a right angle to said direction of feed of said fabric through the folding device.

5,072,678

NEEDLE THREADING APPARATUS FOR A TWO-NEEDLE SEWING MACHINE

Shiro Satoma, Chofu, Japan, assignor to Juki Corporation, Tokyo, Japan

Filed Feb. 27, 1991, Ser. No. 661,671
Claims priority, application Japan, Feb. 28, 1990, 2-47537
Int. Cl.[5] D05B *87/02*
U.S. Cl. 112—225 5 Claims



1. A needle threading apparatus for a two-needle sewing machine comprising:

a needle bar having a first needle and a second needle disposed horizontally apart from said first needle;

a threading mechanism having a rotary shaft, a hook secured to said rotary shaft for threading said needles, and a mounting for supporting said rotary shaft so that said rotary shaft rotates and moves vertically;

means for reciprocating said threading mechanism in a horizontal direction between a first horizontal position where said hook opposes said first needle and a second horizontal position where said hook opposes said second needle; and

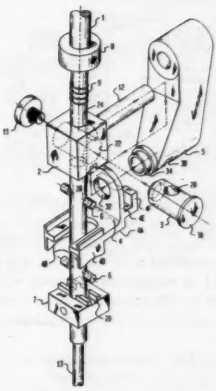
means for positioning said hook in a vertical direction along a line passing a needle hole of said opposed needle so that said hook may selectively oppose one of the needle holes of said needles.

5,072,679

STITCH WIDTH TRACKER FOR SEWING MACHINE

George Lawrie, Mississèuga, Canada, assignor to The Singer Company N.V., Curacao, Netherlands Antilles

Filed May 29, 1990, Ser. No. 530,057
Int. Cl.[5] D05B *3/02, 69/00*
U.S. Cl. 112—443 4 Claims



1. A sewing machine having a vertical needle bar pivotable about a point thereon adjacent an upper end thereof and moveable up and down, a sewing needle detachably secured at one end to a lower end of the bar, and having an eye adjacent the other end, and a hook having a point, the machine having an adjustable stitch width, an arrangement for vertically aligning the eye properly with respect to the hook at all times during an operation of the machine at a present width, so that the eye is vertically aligned with the hook point when the eye is in proximity of the hook at all times, said arrangement comprising:

a first stop secured to said bar at a first location thereon intermediate the ends of the bar;

a second stop secured to the bar at a second and lower position intermediate the ends of the bar;

a member slidable along the bar and disposed on the bar in a space between the two stops;

a spring disposed on the bar between the first stop and the member, the member being moved upward to engage the spring so that the spring exerts a force on the first stop which moves the bar upwardly, the amount of upward movement of the bar being equally related to the amount of upward movement of the member; and

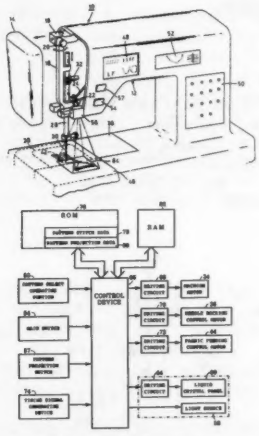
means responsive to the movement of the hook and engaging the member to move the member upward in such manner as to maintain said proper vertical alignment of needle eye and hook point, said means including a mechanism for pivoting the needle bar as required for a zig zag operation and a stationary element disposed between the second stop and the member.

5,072,680

PATTERN STITCH SEWING MACHINE HAVING IMAGE PROJECTION MEANS

Akifumi Nakashima, Ichinomiya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 24, 1990, Ser. No. 602,699
Claims priority, application Japan, Feb. 10, 1990, 2-31020
Int. Cl.[5] D05B 3/02
U.S. Cl. 112—445 27 Claims



1. In a sewing machine including a frame, a needle bar having a needle at the lower end thereof and vertically movably supported by the frame, and a memory storing data relating to various patterns, wherein said needle bar and a work fabric are relatively moved in directions crossing an axis of vertical movement of the needle according to said data read from the memory to sew a pattern on the work fabric; the improvement comprising:

means for providing image data relative to a pattern selectively read from the memory; and

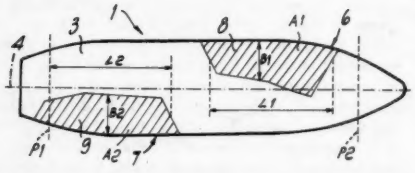
means responsive to said image data for projecting a pattern onto a surface of a bed of said sewing machine or the work fabric on the bed, said projecting means disposed on the frame near the needle bar, a pattern to be projected by said projecting means having the same size, direction and position as a stitch pattern to be obtained after sewing.

5,072,681

PASSENGER SHIP

Maurizio Cergol, Thieste, Italy, assignor to Fincantieri Cantieri Navali Italiani S.p.A., Thieste, Italy

Filed Sep. 21, 1989, Ser. No. 410,214
Claims priority, application Italy, Sep. 26, 1988, 82590 A/88
Int. Cl.[5] B63B 1/00
U.S. Cl. 114—56 16 Claims



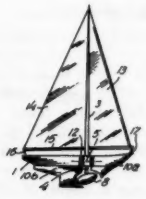
15. Passenger ship comprising a deck and superstructures, said deck defining a longitudinal extension, a bow, and a stern, said superstructure being arranged on said deck so as to define a first open space and a second open space, said first open space and said second open space being mutually asymmetrical with respect to said longitudinal extension, said first open space being proximate to said bow and said second open space being proximate to said stern, said superstructures having, with respect to said deck, an essentially S-shaped plan configuration.

5,072,682

SAILBOAT WITH A PIVOTED MAST-TO-HULL MOUNTING SYSTEM

Augusto C. Rodríguez Urroz, 6990 Montegrande St., 7600 Mar del Plata, Province of Buenos Aires, and Daniel M. Nieto, 2055 Hilarión de la Quintana St., 1636 Olivos, Province of Buenos Aires, both of Argentina

Filed Jul. 3, 1990, Ser. No. 547,516
Int. Cl.[5] B63B 39/02
U.S. Cl. 114—91 8 Claims



1. Improvements in a sailboat including a hull defining an interior, at least a main deck, a bottom and a bow zone, the improvements comprising a sail-mast assembly including a mast part per se adapted for supporting at least one sail for propelling the sailboat, and a lower elongated arm having at its lower end a counterweight member defining a hydrodynamic bulb shape, pivot means linking said sail-mast assembly to the hull to enable relative angular movements between the sail-mast assembly and the hull about a longitudinal axis of the hull, in order that said counterweight member may produce a countertorque opposing the force generated by the wind against the sail-mast assembly, a section of the hull, in the region of said pivot means, forming a through passage from the main deck of the sailboat down to the bottom of the sailboat, the interior of the sailboat being a water-tight around said passage and the hull having respective walls surrounding the passage from the main deck to the bottom of the sailboat, these walls defining lateral passages in the interior of the sailboat to communicate the bow zone with the rest of the interior, the pivot means being mounted on a fore wall and on an aft wall of said walls that surround said through passage.

5,072,683

DRAINABLE PROTECTIVE BOAT MOTOR BAG APPARATUS

Frank Colonna, 203 Glendora Ave., Long Beach, Calif. 90803

Filed Dec. 3, 1990, Ser. No. 620,629
Int. Cl.[5] B63B 59/00
U.S. Cl. 114—222 6 Claims

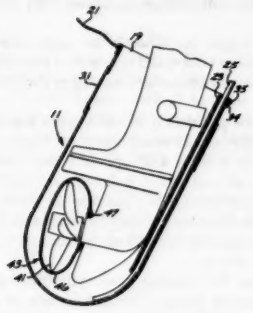
1. Drainable protective boat motor bag apparatus for fitting over a stem of an outdrive of a motor mounted on a transom of a boat and adapted for connection to a water pump and comprising:

a water resistant boot to fit over such propeller and stem, formed with a closed bottom wall, and terminating at its top end in an open mouth adapted to collapse and close on said stem;

fastening means for fastening said mouth onto said stem; and

an open ended channel in said boot extending from said mouth to terminate proximate said bottom wall for receiving an open ended hose to be passed telescopically there-

through whereby said boot may be fitted over stem, said hose inserted in said channel to project from said outlet so



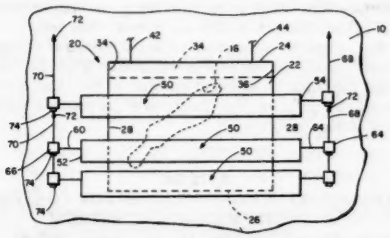
that such pump may be connected to said hose to draw any residual water from said boot.

5,072,684

MEANS FOR PREVENTING LEAKS FROM A LIQUID-BULK CARRIER CARGO SHIP

Frank R. Pryor, Box 243, Minersville, Utah 84752

Filed Feb. 28, 1991, Ser. No. 662,174
Int. Cl.[5] B63B *43/16*
U.S. Cl. 114—229 **5 Claims**



1. In a liquid-bulk carrier cargo ship having a hold defined in part by a hull portion and a deck portion of the ship, the improvement in combination therewith comprising:

(A) an electromagnet having ends, a sidewall connecting said ends together, a longitudinal centerline extending between said ends and a length dimension measured along said longitudinal centerline between said two ends;

(B) two electrical leads connected to said electromagnet;

(C) a control panel connected to said electrical leads, said control panel being electrically connected to said electromagnet electrical leads and having two female jack elements;

(D) a power source electrically connected to said control panel to be electrically connected to said electromagnet electrical leads and to said control panel female jack elements via said control panel;

(E) a flexible, fluid-impermeable one-piece blanket, said blanket having a top edge, a bottom edge, two side edges connecting said blanket top edge to said blanket bottom edge, a width dimension measured between said blanket side edges and a length dimension measured between said blanket top edge and said blanket bottom edge, said electromagnet being embedded in said blanket adjacent to said blanket top edge, said electromagnet length dimension being equal to said blanket width dimension; and

(F) a plurality of electromagnetic holding elements covering said blanket and attaching said blanket to a ship's hull, each electromagnetic holding element including

(1) ends, a sidewall connecting said holding element ends together, a longitudinal centerline extending between said holding element ends, a length dimension measured between said electromagnetic holding element ends along said holding element longitudinal centerline, said holding element length dimension being greater than said electromagnet length dimension,

(2) an electromagnet,

(3) an electrical lead electrically connected to said holding element electromagnet at each of said holding element ends,

(4) an electrical connecting element electrically connected to each holding element electrical lead at an end of said each lead that is remote from said holding element, said electrical connecting element including a female jack element electrically connected to said holding element electrical lead, and

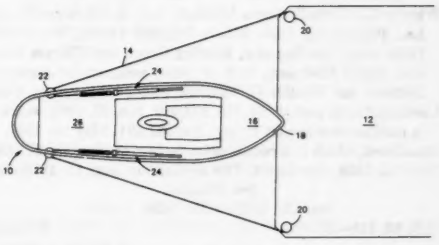
(5) a further electrical lead connected at one end thereof to said electrical connecting element, each further electrical lead including a male jack element on an end thereof remote from said electrical connecting element, said further electrical lead male jack elements being electrically connected to said control panel female jack elements.

5,072,685

HYDRAULIC SYSTEM FOR TUG/BARGE CONNECTIONS

Robert Kaucic, Newark, Del., assignor to Express Marine, Inc., Pennsauken, N.J.

Filed Jun. 20, 1990, Ser. No. 541,254
Int. Cl.[5] B63B *21/00*
U.S. Cl. 114—249 **19 Claims**



1. A hydraulic system adapted to be mounted on a tug or barge and connected to a tug-to-barge connection for tightening and slacking said connection, comprising:

a closed-loop hydraulic driving means connected to move a portion of said connection extending between said barge and said tug forcibly back and forth for maintaining constant tension on the connection to compensate for forces having a tendency for tightening or slacking the same;

said hydraulic driving means including hydraulic pumping means having a hydraulic inlet and a hydraulic outlet connected by interconnecting means for forcibly moving said hydraulic fluid and said connection back and forth to urge said connection in a tightening or slacking direction to maintain a constant tension on said connection; and

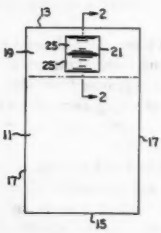
said hydraulic interconnecting means forming a closed hydraulic loop with hydraulic fluid trapped in the loop between said hydraulic driving means, said hydraulic inlet, said hydraulic outlet and said hydraulic interconnecting means.

5,072,686

BOOK MARK AND PEN HOLDER

Rita J. Falco, 34 Sagamore Dr., Seymour, Conn. 06483

Filed May 6, 1991, Ser. No. 696,080
Int. Cl.[5] B42D 9/00
U.S. Cl. 116—234 2 Claims



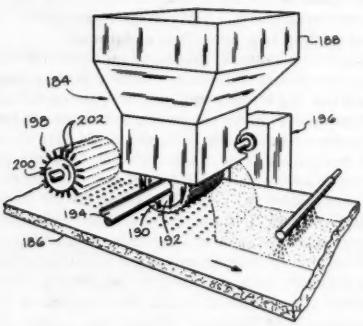
1. A combination book marker and pen holder, comprising a thin flat panel adapted for positionment between the pages of a book to indicate the end point of a reading session; said panel having one end zone thereof extendable beyond the upper edges of the book pages when the panel is positioned within the book; and means mounted on said one end zone for holding a pen in a prone position extending generally parallel to the panel surface; said pen holder means comprising a single strip of material that includes a flat central strip section mounted flatwise on the panel surface, and two resilient circular coil sections extending in opposite directions from said flat strip section; said circular coil sections being normally resiliently biased into contact with each other, but being spreadable apart when a pen is moved between the two coil sections, whereby the pen may be releasably retained between the two coil sections.

5,072,687

ABSORBENT PRODUCT FOR PERSONAL USE

Winalee G. Mitchell; James Mitchell, both of 110 Secor Woods La., Perrysburg, Ohio 43551; Michael Plotka, Waterville, Ohio; Gary Van Streader, Bowling Green, and Thomas Krassow, North Baltimore, both of Ohio, assignors to James G. Mitchell and Winalee G. Mitchell, both of Perrysburg, Ohio

Continuation-in-part of Ser. No. 372,030, Jun. 27, 1990, which is a continuation-in-part of Ser. No. 352,491, May 16, 1989, abandoned, which is a continuation-in-part of Ser. No. 272,160, Nov. 16, 1988, abandoned. This application Aug. 13, 1990, Ser. No. 566,254
Int. Cl.[5] B05B 3/02; B05C 11/00
U.S. Cl. 118—37 8 Claims



1. Apparatus for depositing particulate material on a moving substrate, in at least two different concentrations in discreet portions of said substrate, said apparatus comprising, in combination,

a horizontal conveyor for supporting the substrate and conveying the substrate at a substantially constant rate of speed,

a material hopper for holding the particulate material, said hopper being positioned above said conveyor,

means defining a discharge opening in the lower end of said hopper,

dosing means positioned in the hopper discharge opening, said dosing means comprising an outer, discontinuous, cylindrical surface and opposed end plates which, together, abut said means defining said discharge opening, thereby preventing the passage of particulate material between said means defining the discharge opening, on the one hand, and the cylindrical surface and the end plates on the other hand,

drive means for rotating said cylindrical surface of said dosing means about a horizontal axis at a substantially constant rate of rotation, said horizontal axis being positioned relative to said discharge opening so that, at any given angle of rotation of the cylindrical surface, a portion of the cylindrical surface is inside said material hopper and the remaining portion of the cylindrical surface is not inside said material hopper,

means defining a first set of dosing depressions in a first portion of said outer cylindrical surface, said first set of dosing depressions having a given volume per unit of cylindrical surface area and

means defining a second set of dosing depressions in a second portion of said cylindrical surface, said second set of dosing depressions having a volume per unit of cylindrical surface area which is less than the given volume per unit of cylindrical surface area and greater than zero,

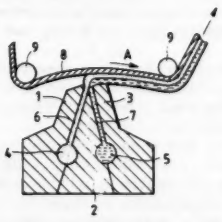
so that, when the cylindrical surface is rotated at a constant rate, particulate material is withdrawn from the hopper and deposited on different portions of the substrate in at least two different concentrations every time the cylindrical surface revolves.

5,072,688

EXTRUSION-TYPE COATING HEAD FOR COATING A MAGNETIC RECORDING MEDIUM

Naoyoshi Chino; Yasuhito Hiraki; Norio Shibata, and Tsunehiko Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 376,268, Jul. 3, 1989, Pat. No. 5,030,484. This application Feb. 7, 1990, Ser. No. 476,218
Claims priority, application Japan, Jul. 4, 1988, 63-164901
Int. Cl.[5] B05C 5/02, 9/06
U.S. Cl. 118—411 13 Claims



1. An extrusion-type coating head comprising:

a rear block defining a back edge;

a front block defining a doctor edge; and

an intermediate block disposed between said rear and front blocks, a first slit being defined between said rear block and said intermediate block for accommodating a flow of a first coating solution, a second slit being defined between said front block and said intermediate block for accommodating a flow of a second coating solution, a slot

being formed between an end portion of said intermediate block and an outlet of said head, wherein said end portion is rounded with a radius of curvature of no more than 1 mm.

5,072,689

CONTINUOUS HOT-DIP PLATING APPARATUS

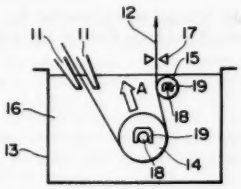
Mitsuo Nakagawa, Mito; Hitoshi Okoshi, Hitachi; Osamu Shitamura; Hiroki Numata, both of Katsuta; Mituo Taguchi, Iwaki; Teruo Yamaguchi; Yasunobu Kani, both of Hitachi, and Toshio Kamata, Katsuta; Takahiko Ookouchi, Katsuta; Junji Sakai, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 13, 1989, Ser. No. 365,547

Claims priority, application Japan, Jun. 15, 1988, 63-145754

Int. Cl.[5] B05C *3/12*

U.S. Cl. 118—419 **25 Claims**



1. A bearing system for a hot-dip plating apparatus, comprising:

a predetermined quantity of a molten plating metal;

a pair of bearing shells immersed in the molten plating metal having ceramic tubular bearing sleeves, each having an interior diameter;

a roll immersed in the molten plating metal having opposite ends, each end of the roll having a shaft with a diameter smaller than the interior diameter of the sleeves, each of the shafts being rotatably supported by one of said sleeves, such that there is a gap between each said shaft and a respective sleeve for admitting the molten metal during operation of the apparatus to lubricate the bearing system; and

said bearing sleeves being sectional ceramic sleeves secured to backing members by through bolts.

5,072,690

DEVELOPING DEVICE OF ELECTROPHOTOGRAPHIC PRINTER

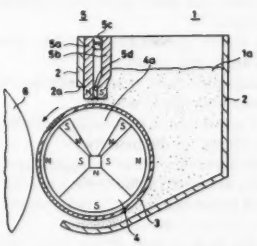
Yasushi Ishikawa; Fumio Tomono, and Tetsuya Fujita, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1991, Ser. No. 686,640

Claims priority, application Japan, Apr. 27, 1990, 2-113679; Jun. 28, 1990, 2-68833[U]

Int. Cl.[5] G03G *15/09*

U.S. Cl. 118—658 **13 Claims**



1. A developing device for use in an electrophotographic printer comprising a non-magnetic cylindrical developing sleeve for supporting magnetic toner on its surface and conveying the same in a rotating condition, toner supply means for supplying the magnetic toner onto said developing sleeve, fixed magnetic field generating means disposed inside said developing sleeve, doctor blade means disposed in confronting relation to the surface of said developing sleeve for regulating the layer thickness of the magnetic toner, said doctor blade means being made of a pair of magnetic members whose distal ends are spaced a given distance from each other and magnetized as to exhibit opposite magnetic polarities, said fixed magnetic field generating means having a notch formed in a section facing said magnetic members such that the magnetic flux generated by said fixed magnetic field generating means does not act virtually on said magnetic members.

5,072,691

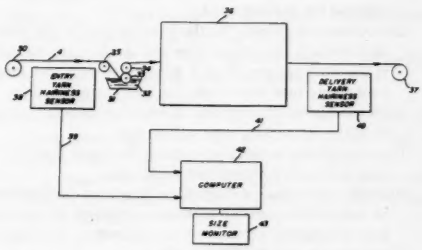
APPARATUS FOR MONITORING SIZE ENCAPSULATION OF YARN ON A SLASHER

Charles F. Strandberg, Jr., 202 Longview Rd., High Point, N.C. 27260, and Robert C. Strandberg, 1718 Aftonshire Dr., Greensboro, N.C. 27410

Filed Oct. 30, 1989, Ser. No. 428,992

Int. Cl.[5] B06C *11/00*

U.S. Cl. 118—679 **7 Claims**



1. Apparatus for quantifying size encapsulation of yarn on a slasher comprising:

a. an entry hairiness sensor positioned at the entry side of the slasher prior to size application of the yarn for producing a signal proportional to the hairiness of the yarn before it is sized,

b. a delivery hairiness sensor positioned a the delivery side of a slasher for producing a signal proportional to the hairiness of the yarn after the yarn has been sized in the slasher, and

c. a mathematical equation solving computer responsive to the signals from the entry and delivery hairiness sensors for solving the equation:

$$\text{Size Encapsulation} = 360\left(1 - \frac{\text{Hairs at Delivery}}{\text{Hairs at Entry}}\right)\text{degrees},$$

whereby the degree of size encapsulation of the yarn is determined by said computer as the yarn exits the slasher.

5,072,692

APPARATUS FOR IMPREGNATING WOOD INCLUDING MONITOR UNIT

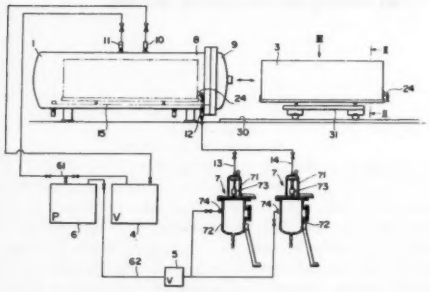
Nobuo Ikeda, 22-12, Aza Matsuzaki, Sostoasahikawa, Akita-shi, Akita, Japan

Division of Ser. No. 244,901, Sep. 15, 1988, Pat. No. 4,992,307. This application Jan. 12, 1990, Ser. No. 464,405

Claims priority, application Japan, May 25, 1988, 63-12810 1; Jun. 3, 1988, 63-74149

Int. Cl.[5] B05C *3/02*

U.S. Cl. 118—713 4 Claims



1. An apparatus for impregnating a liquid such as a resinous liquid into wood, which apparatus comprises:

a) a pressure tank accommodating timbers to be subjected to impregnation, which is suitable for pressure and vacuum;

b) a plurality of monitoring units connected to a suction pipe of the pressure tank each having a filter section and a monitoring section;

c) each of said monitoring units holding in its filter section a monitoring timber substantially identical in properties with the timbers in said tank through a conduit accommodated in the pressure tank;

d) an evacuating means for the liquid and air in the pressure tank through the suction pipe and the monitoring timbers in the filter section of each monitoring unit and through connecting tube means into the monitoring section;

e) means for maintaining the monitoring timbers in contact with the connecting tube means; and

f) a pressurizing means for injecting the liquid into the pressure tank under pressurized conditions;

whereby impregnation state of the liquid into the timbers can be known through the monitoring timbers of the respective monitoring units, without suspending the liquid impregnation into the timbers.

5,072,693

CONDUCTOR PASSAGE AT A VACUUM CONTAINER

Siegfried Straemke, Fichtenhain 6, D-5135, Selfkant 4, Fed. Rep. of Germany

Filed Apr. 3, 1990, Ser. No. 504,331

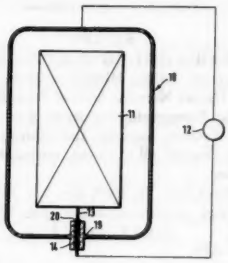
Claims priority, application Fed. Rep. of Germany, Apr. 5, 1989, P3910931

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—715 7 Claims

1. Conductor passage at a vacuum container, with an insulating body sealingly penetrating the wall of the container and having a conductor extending therethrough.

characterized in that the insulating body, at surfaces within the vacuum container, gives off a fluid preventing the deposition of material on said surfaces, and that, within the container, lamellae project from the core of the insulating body, between which lamellae the medium issuing from the insulating body flows to the outside.



5,072,694

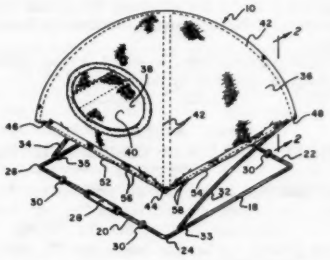
PET BED AND ENCLOSURE

William A. Haynes, 1140 S. Beechem Rd., Williamstown, N.J. 08094, and William M. Haynes, 23 S. Jackson St., Batavia, Ill. 60510

Filed Nov. 6, 1990, Ser. No. 609,740

Int. Cl.[5] A01K *1/02*

U.S. Cl. 119—19 19 Claims



1. A pet bed and enclosure device comprising:

(a) an upper frame comprising a front section, and a rear section,

(b) a flexible sheet panel suspended from and spanning the upper frame,

(c) a base frame supportable on a floor comprising a front section and a rear section,

(d) two angled resilient support members each comprising upper and lower ends wherein:

(i) each lower end is structurally attached proximate the front section of the base frame,

(ii) each support member is angled upwardly and rearwardly at a sharp acute angle from the base frame, and

(iii) each upper end is structurally attached proximate the rear section of the upper frame,

wherein the front section of the upper frame is supported proximate over the front section of the base frame, and

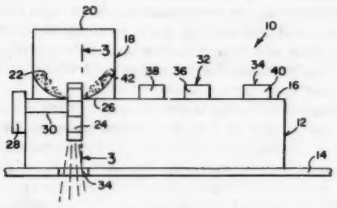
(e) enclosure means supported over the upper frame to provide an enclosure for a pet lying on the sheet panel.

5,072,695

AUTOMATIC FISH FEEDER

Maurice M. Newton, 1321 Laurel Cres, Norfolk, Va. 23505, and George Spector, 233 Broadway, New York City, N.Y. 10007

Filed May 21, 1990, Ser. No. 526,642
Int. Cl.[5] A01K *5/00*
U.S. Cl. 119—51.04 1 Claim



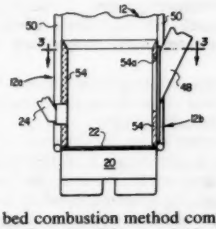
1. An automatic fish feeder comprising the combination of:
a) a housing removably coupled to a fish tank light fixture, said housing having a top support surface with an inlet and a feeding aperture beneath and aligned with said inlet through said housing and light fixture;
b) a container having an open top for receiving fish food therein, said container carried on said top support surface of said housing and having a centered outlet aligned with said inlet;
c) a sprocket rotatably mounted in said housing aligned with said outlet and inlet so as to extend into the bottom of said container to collect a portion of the fish food;
d) an electric motor having a shaft coupled to said sprocket; and
e) means carried on said top support surface to operate said electric motor at specific timed intervals so as to rotate said sprocket to deposit the fish food through said feeding aperture in said housing and the light fixture into the fish tank to feed the fish, said aperture being aligned with said sprocket and;
f) means for causing food to enter sprocket at all levels of food in said housing, wherein said operating means is an electric circuitry which includes a transformer connected to a remote power source, a relay connected to said transformer and a timer connected between said relay and said electric motor; wherein said container includes an inside curved bottom wall so as to allow all the fish food to move towards said sprocket when said sprocket rotates and wherein said sprocket is centered relative to said container.

5,072,696

FURNACE TEMPERATURE CONTROL METHOD FOR A FLUIDIZED BED COMBUSTION SYSTEM

Iqbal F. Abdulally, Randolph, N.J., assignor to Foster Wheeler Energy Corporation

Filed Dec. 11, 1990, Ser. No. 626,134
Int. Cl.[5] B09B *3/00*; F22B *1/00*
U.S. Cl. 122—4 D 4 Claims



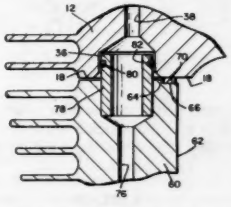
1. A fluidized bed combustion method comprising the steps of fluidizing a bed of combustible material in a furnace at least a portion of which is formed by water tubes, passing water through said tubes to absorb heat from the combusted fuel and raise the temperature of said water, discharging a mixture of flue gases and entrained particulate material from the fluidized bed in said furnace, separating said entrained particulate material from said flue gases, passing said separated flue gases to a heat recovery section, passing said separated particulate material into the fluidized bed in said furnace, installing refractory material around said tubes to reduce the absorption of heat by said water, and selecting the amount of refractory material installed in accordance with the desired operating temperature of said furnace.

5,072,697

SEALING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Alan C. Sputhe, 11185 Lime Kiln Rd., Grass Valley, Calif. 95949

Filed Mar. 13, 1991, Ser. No. 668,622
Int. Cl.[5] F02F *1/06*
U.S. Cl. 123—41.69 29 Claims



1. In an internal combustion engine, the combination comprising:
a cylinder block having an end surface and a cylinder bore;
a cylinder head having an end surface facing said block end surface;
gasket means about said cylinder bore and between said end surfaces;
means securing said block and said head with said gasket means compressed by said end surfaces;
a fluid passage in said head and including a fluid passage bore extending to said head end surface;
a fluid passage in said block;
a nipple communicating with said block fluid passage, said nipple protruding from said block end surface and received by said fluid passage bore in said head; and
sealing means carried by said nipple, said sealing means received by and sealingly seating against said fluid passage bore in said head.

5,072,698

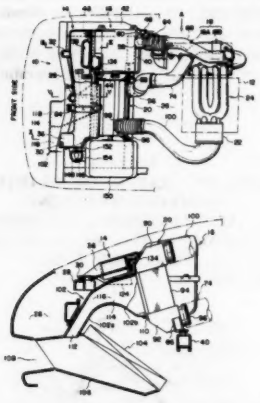
INTAKE APPARATUS FOR ENGINE

Shinji Fujihira; Yuko Yanagidani, both of Hiroshima; Isao Tohda, Yokohama, and Shinji Kanbara, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed May 29, 1990, Ser. No. 529,572
Claims priority, application Japan, May 30, 1989, 1-136947; Dec. 11, 1989, 1-322184
Int. Cl.[5] F02M *35/10*
U.S. Cl. 123—52 MB 14 Claims

1. An intake apparatus for an engine, which comprises:
an intake duct, arranged in an engine room, for supplying intake air to the engine;
cooling means, arranged in said engine room, for cooling intake air;
an auxiliary duct connected to said intake duct and designed so that the intake air can be further introduced thereto, the auxiliary duct including a cooling duct for introducing travel wind as cooling air to said cooling means, and a

communication duct for causing said cooling duct to communicate with said intake duct; and



valve means, arranged in said auxiliary duct, for causing said auxiliary duct to communicate with said intake duct in a specific driving state requiring a high engine output.

5,072,699

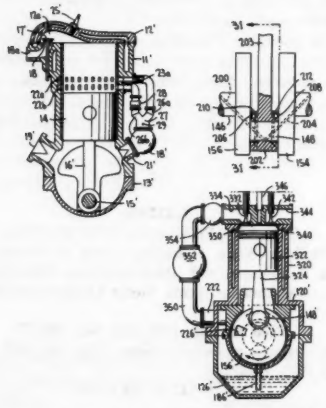
INTERNAL COMBUSTION ENGINE

Pao C. Pien, 1105 Marbelle Club, 840 S. Collier Blvd., Marco Island, Fla. 33937

Continuation-in-part of Ser. No. 381,286, Jul. 18, 1989, abandoned, which is a continuation-in-part of Ser. No. 182,956, Apr. 18, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 468,286

Int. Cl.[5] F02B *25/08*

U.S. Cl. 123—65 VC **20 Claims**



1. An internal combustion engine, comprising a cylinder block having a crankcase and a cylinder including a cylinder wall, inlet port means in communication with said cylinder and comprising port means formed in said cylinder wall, outlet port means in communication with said cylinder, a crank shaft journalled in said crankcase, a piston mounted for reciprocation within said cylinder, a connecting rod connecting said piston with said crankshaft, said piston cooperating with said cylinder to define an expansible/compressible combustion space above said piston, said piston forming the top of a compression space below said piston, passage means exterior of said cylinder block for transferring compressed air from said compression space to said combustion space through said inlet port means, first valve means through which ambient air flows into said compression space and through which substantially no air flows from said compression space into ambient air, second valve means through which compressed air flows from said compression space into said passage means and through which substantially no compressed air flows from said passage means into said compression space whereby the compression process within said compression space is substantially independent of the processes occurring in said combustion space, exhaust means connected with said outlet port means for exhausting said combustion space, means for creating a combustible fuel-air mixture in said combustion space, means causing ignition of the fuel-air mixture in said combustion space, and control means for controlling the speed and torque of the engine, said passage means comprising first passage means for supplying air to said combustion space and second passage means for supplying fuel-air mixture to said combustion space, said control means comprising flow control means for connecting and disconnecting said inlet port means with said first and second passage means.

5,072,700

ELECTROMAGNETIC VALVE CONTROL SYSTEM

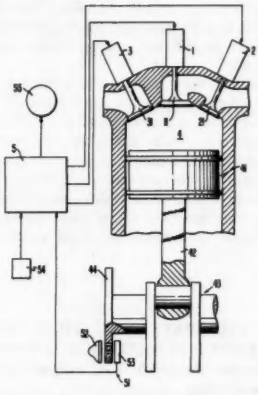
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Kanagawa, Japan

Filed Dec. 12, 1990, Ser. No. 626,021

Claims priority, application Japan, Dec. 12, 1989, 1-322423

Int. Cl.[5] F01L *9/04*

U.S. Cl. 123—90.11 **3 Claims**



1. An electromagnetic valve control system for electromagnetically opening and closing intake and exhaust valves in an engine having a crankshaft, comprising:

intake valve actuating means for opening an intake valve;

exhaust valve actuating means for opening an exhaust valve;

auxiliary exhaust valve actuating means for opening an auxiliary exhaust valve before said exhaust valve is opened;

valve operation detecting means for detecting actual operating conditions of the intake valve, the exhaust valve, and the auxiliary exhaust valve;

rotation detecting means for detecting the rotational speed of the engine and the angle of the crankshaft;

load detecting means for detecting the load on the engine;

means for applying actuating signals to said intake, exhaust, and auxiliary exhaust valve actuating means in synchronism with a crankshaft angle signal from said rotation detecting means, based on the detected rotational speed and load; and

signal correcting means for correcting said actuating signals based on detected signals from said valve operation detecting means.

5,072,701

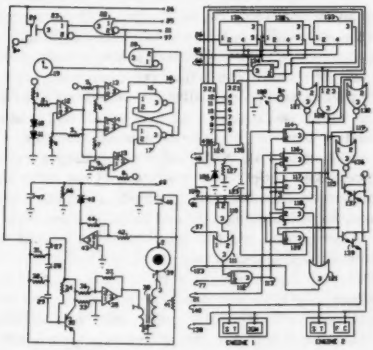
APPARATUS FOR AUTOMATICALLY STARTING ENGINES

Rakib Khan, and Arif Khan, both of 2850 W. Berwyn Ave., Chicago, Ill. 60625

Continuation-in-part of Ser. No. 63,922, Jun. 19, 1987, abandoned. This application Aug. 30, 1988, Ser. No. 238,118

Int. Cl.[5] F02N *17/00*

U.S. Cl. 123—142.5 E **11 Claims**



1. Apparatus for maintaining at least one gas or diesel engine at a ready-to-start temperature under ready-to-drive conditions corresponding to a set of predefined engine parameters, the engine including starter means and fuel supply means, said apparatus comprising,

means for sensing engine temperature and generating a corresponding first electrical signal indicative of the instantaneous temperature of said engine,

means for sensing engine vibration or sound and generating a corresponding second electrical signal indicative of whether or not said engine is running,

means for sensing engine motion and generating a corresponding third electrical signal indicative of movement of said engine from a stationary position, and

control means for regulating the starting and stopping of said engine, said control means including

means responsive to said first electrical signal for starting said engine, by activating said starter and fuel supply means, when the engine temperature drops below a predetermined temperature value, and for deactivating said fuel supply means to thereby stop said engine when the engine temperature moves above a predetermined temperature value,

means for controlling said means for starting for providing a predetermined maximum number of successive attempts to start said engine if prior attempts to start said engine have failed,

means responsive to said second electrical signal for changing predefined engine parameters including the activation time of said starter means, for each attempt to start said engine,

means responsive to said third electrical signal for disabling said fuel supply means to stop said engine if a predetermined amount of motion is detected.

5,072,702

ENGINE SHUT-DOWN DEVICE

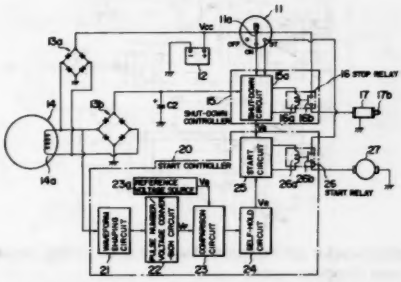
Asao Sasaki, Noda, and Masami Minegishi, Urawa, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 26, 1990, Ser. No. 544,226

Claims priority, application Japan, Jun. 29, 1989, 1-76971; Jun. 29, 1989, 1-167646

Int. Cl.[5] F02D *17/04;* **F02N** *11/10*

U.S. Cl. 123—179.4 **6 Claims**



1. An engine shut-down control device mounted on an engine having a starter for starting said engine, a key switch operatively connected to said starter for turning said starter on and off, a shut-down actuator provided to shut down said engine, a magneto for generating electric power and for generating an engine rotation signal dependent on engine rotation when said key switch is turned off, and control means for maintaining output of an engine shut-down signal to said shut-down actuator while said engine rotation signal is generated and for simultaneously terminating output of an engine shut-down signal immediately after said magneto stops output of said engine rotation signal in order to release said shut-down actuator, an improvement of the device which comprises:

a waveform shaping circuit responsive to said engine rotation signal for converting an alternating current into a pulse wave by rectifying and for producing a pulse signal;

a conversion circuit responsive to said pulse signal for charging said pulse wave into a pulse frequency and for generating a voltage signal indicative thereof;

a comparison circuit responsive to said voltage signal for comparing said pulse frequency with a reference voltage and for outputting an operational signal;

a starter circuit responsive to said engine shut-down signal and said operational signal for maintaining said starter in a non-electrified condition so as to release said shut-down actuator and to prevent said device from wasting electric power when said engine stops.

5,072,703

APPARATUS FOR THE AUTOMATIC STARTING RUNNING, AND STOPPING OF AN INTERNAL COMBUSTION ENGINE

Loran W. Sutton, East Peoria, Ill., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Oct. 16, 1990, Ser. No. 600,406

Int. Cl.[5] F02N *11/08*

U.S. Cl. 123—179.4 **25 Claims**

1. An apparatus for maintaining a comfortable truck sleeper unit temperature of a truck having a truck engine, and reducing idling time of the truck engine, comprising:

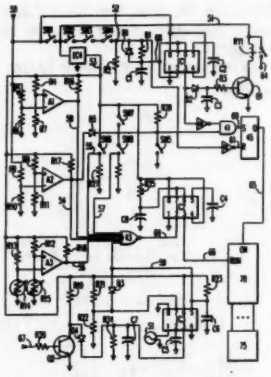
temperature sensing means within said truck sleeper unit,

means for starting, running and stopping the truck engine in accordance with said temperature sensing means thereby supplying heating or cooling only as needed,

means for detecting when said truck is safely parked and idling,

means for automatically enabling said starting means after

said means for detecting when said truck is safely parked and idling indicates said truck has been safely parked and idling for a predetermined amount of time,



and means for automatically disabling said starting, running, and stopping means.

5,072,704

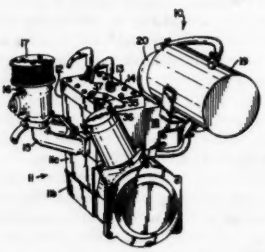
PERSONAL WATERCRAFT VEHICLE ENGINE

Edward H. Webb, Paynesville, Minn., assignor to Koronis Parts, Inc., Paynesville, Minn.

Continuation of Ser. No. 364,794, Jun. 9, 1989, abandoned. This application Sep. 6, 1990, Ser. No. 579,107

Int. Cl.[5] F02N *15/06*

U.S. Cl. 123—179.1 **10 Claims**



1. A personal watercraft vehicle engine comprising:

(a) a crankcase having an upper portion and a lower portion

(b) a crankshaft operatively mounted in said crankcase, the crankshaft residing in a substantially horizontal orientation, the crankshaft having a longitudinal axis;

(c) a sealed flywheel housing, the sealed flywheel housing being axially aligned with the crankshaft;

(d) a flywheel cooperatively connected to said crankshaft, the flywheel residing in the flywheel housing, the flywheel housing being rigidly affixed to the crankcase;

(e) said flywheel having a plurality of gear teeth around its periphery; and

(f) a starter mounted in an opening defined in a plane parallel to the crankshaft and perpendicular to the starter axis, the starter being perpendicular to the crankshaft, in an uppermost portion of the sealed flywheel housing, the starter having a pinion gear, the pinion gear being engagable with the plurality of gear teeth on the periphery of the flywheel, whereby said starter is not as adversely affected by water.

5,072,705

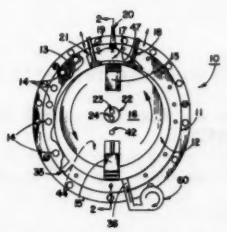
ROTARY ENGINE AND METHOD

Kenneth Overman, Rte. 2, Box 407, Liberty, N.C. 27298

Filed Feb. 21, 1991, Ser. No. 658,705

Int. Cl.[5] F02B *53/04*

U.S. Cl. 123—231 **22 Claims**



1. A rotary engine comprising: an engine block, said block defining an internal rotor cavity, a rotor, said rotor eccentrically positioned within said cavity, said block defining a combustion chamber, said combustion chamber positioned exteriorly of said rotor cavity and in fluid communication therewith, a pair of pistons, said pistons affixed to each other and slidably mounted within said rotor, an air inlet valve, said inlet valve positioned at one side of said combustion chamber, a dual acting outlet valve, said outlet valve comprising a top and a bottom rest, said outlet valve positioned at the other side of said combustion chamber, said combustion chamber defining both an outlet valve ceiling port and an outlet valve floor port, means to ignite fuel, said fuel ignition means located within said combustion chamber between said inlet and outlet valves, said block defining an exhaust port, said exhaust port spaced circumferentially from said combustion chamber and in fluid communication with said rotor cavity, said block defining an inlet port, and said inlet port circumfrentially spaced from said outlet port and in fluid communication with said rotor cavity.

5,072,706

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES, IN PARTICULAR DIESEL ENGINES

Ewald Eblen, Stuttgart; Karl Hofmann, Remseck; Alfred Schmitt, Ditzingen; Max Straubel, and Hung Truong-Canh, both of Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

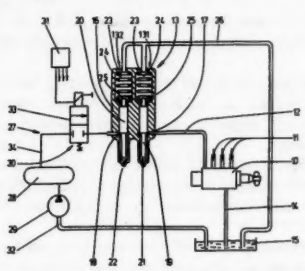
PCT No. PCT/DE87/00410, § 371 Date Jun. 9, 1988, § 102(e) Date Jun. 9, 1988, PCT Pub. No. WO88/02814, PCT Pub. Date Apr. 21, 1988

Continuation of Ser. No. 221,462, filed as PCT/DE87/00410, Sep. 11, 1987, published as WO88/02814, Apr. 21, 1988, abandoned. This PCT application Sep. 11, 1987, Ser. No. 542,808

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1986, 3634962

Int. Cl.[5] F02M *45/00*

U.S. Cl. 123—297 **13 Claims**



1. Fuel injection arrangement for internal combustion en-

gines, particularly for diesel engines, comprising a plurality of injection nozzles for injection of a quantity of fuel to each of a plurality of combustion cylinders of an internal combustion engine, which fuel quantity is divided into a proportioned advance injection quantity and a subsequently injectable proportioned main injection quantity, at least one of said injection nozzles being respectively assigned to one of said cylinders of the internal combustion engine, a high-pressure fuel storage held at injection pressure level by means of a high-pressure fuel supply pump and further being connectable in turn via a time controlled solenoid valve (30) to said injection valves for injection of said proportioned advance injection quantity and a separately driven high-pressure fuel injection pump for injection of said proportioned subsequent main injection quantity.

5,072,707

SPLIT THRUST BEARING FOR OUTBOARD ENGINE

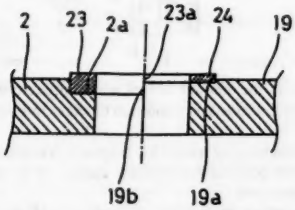
Kiichiro Takai, and Haruo Sano, both of Nagoya, Japan, assignors to Aichi Kikai Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Dec. 22, 1989, Ser. No. 454,987

Claims priority, application Japan, Dec. 26, 1988, 63-168028[U]; Nov. 4, 1989, 1-129185[U]

Int. Cl.[5] F02B *75/02*

U.S. Cl. 123—311 **1 Claim**



1. An outboard engine comprising:

a four-cycle engine having a crankshaft extending substantially vertically while running; and

a thrust metal mounted on bearing portions formed on a cylinder block and a bearing cap of the engine, respectively, for supporting the crankshaft, said thrust metal being composed of a pair of semicircular plates having a different thickness from each other;

said semicircular plates being received within semicircular grooves formed on said bearing portions of the cylinder block and the bearing cap with different depth from each other, respectively, in such a manner that the mating surface of one of said semicircular plates having larger thickness contacts the end surface of one of said semicircular grooves having shallower depth.

5,072,708

ENGINE CONTROL DEVICE

Bernd Leiberoth-Leden, Leonberg, and Rainer Norgauer, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

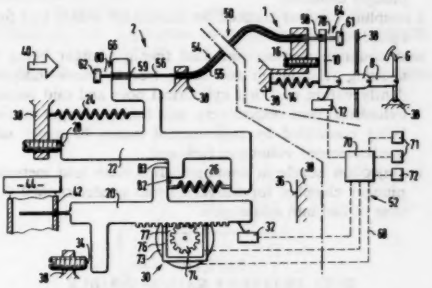
Filed Mar. 19, 1991, Ser. No. 671,613

Claims priority, application Fed. Rep. of Germany, May 14, 1990, 4015423

Int. Cl.[5] F02D *7/00*

U.S. Cl. 123—399 **20 Claims**

1. An engine control device in a vehicle, for controlling a power output of an engine (44), having a first control group (1), including an accelerator (6), a first link element (10) actuatable by the accelerator (6), a set-point transducer (12) for detecting a position of the accelerator (6), and a restoring spring (14) which returns the accelerator (6) to a position of repose, and having a second control group (2), including an actuator (20) that determines the power output and a second link element (22), a control drive (30) for adjusting the actuator (20) as a function of electrical adjustment signals, a restoring spring (24) which urges the actuator (20) in a direction of less power output, mechanical (50) and electrical (52) transmission means, via which a control command can be transmitted from the first control group (1) to the second control group (2), wherein the mechanical transmission means (50) are connected to the first link element (10) via a first clearance (64) that at most insignificantly hinders a motion of the first link element



(10) in the direction of less power output of the engine (44), and said mechanical transmission means are connected to the second link element (22) via a second clearance (66) at most insignificantly hindering motion of the second link element (22) in the direction of greater power output of the engine (44), and wherein a play (78, 80) is present, at least in a region of one of the two clearances (64, 66), when a position of the actuator (20) corresponds to a position of the accelerator (6).

5,072,709

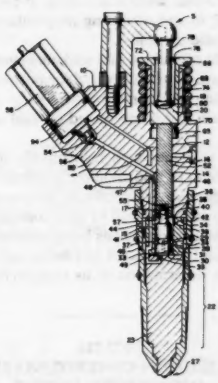
FUEL INJECTION FOR AN INTERNAL COMBUSTION ENGINE

Martin W. Long, Columbus, Ind.; Charles B. Fry, Columbus, Ind.; David M. Rix, Columbus, Ind., and Raul Krivoy, Beaverton, Oreg., assignors to Cummins Engine Co., Inc., Columbus, Ind.

Filed Mar. 29, 1990, Ser. No. 501,022

Int. Cl.[5] F02M *59/02*

U.S. Cl. 123—446 **6 Claims**



1. A fuel injector for use in an internal combustion engine comprising:

an injector body having a first cylindrical bore and a second cylindrical bore, said second cylindrical bore being coaxially positioned relative to and in communication with said first cylindrical bore;

control means for metering a predetermined volume of fuel at high pressure;

a metering barrel having a metering chamber for receiving said predetermined volume of fuel at high pressure, said metering barrel being connected to said injector body;

a timing plunger chamber forming part of said second cylindrical bore and being in continuous fluid communication with said control means for metering said predetermined volume of fuel;

a timing plunger adapted for movement within said timing plunger chamber;

a coupling member adapted for movement within said first cylindrical bore;

said coupling member and said timing plunger being in abutting relationship and being free to move independently within said first cylindrical bore and said second cylindrical bore respectively, said timing plunger motion being controlled by said control means to meter said predetermined volume of fuel; and

an injection nozzle in communication with said metering plunger chamber for delivering said predetermined volume of fuel into said engine.

5,072,710

FUEL DELIVERY RAIL ASSEMBLY

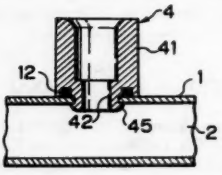
Katsushi Washizu, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed May 1, 1990, Ser. No. 517,037

Claims priority, application Japan, May 6, 1989, 1-51958[U]

Int. Cl.[5] F02M *55/02*; F16L *41/00*

U.S. Cl. 123—470 **2 Claims**



1. A fuel delivery rail assembly for an internal combustion engine, comprising:

an elongated conduit having a plurality of guide holes formed in one wall thereof, and having a fuel passage of a generally rectangular hollow section;

a plurality of tubular sockets attached, at respective bottom sides thereof, to and extending perpendicularly from said one wall of said conduit;

said bottom side of each of said sockets being provided with an annular extension and a shoulder portion, said shoulder portion having a downwardly opening annular groove formed therein and being seated on said one wall of said conduit;

a plurality of seal members respectively mounted in said annular grooves of said shoulder portions of said sockets, and being disposed respectively between said shoulder portions and said one wall of said conduit; and

each of said annular extensions being inserted into a respective one of said guide holes and being tightly fixed to said conduit by a deformation of its respective annular extension.

5,072,711

FUEL INJECTION CONTROL SYSTEM FOR AUTOMOTIVE ENGINE

Kenji Katayama, and Seiji Yashiki, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 26, 1990, Ser. No. 589,918

Claims priority, application Japan, Sep. 27, 1989, 1-253086

Int. Cl.[5] F02D *41/04*

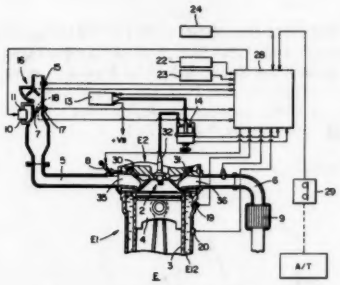
U.S. Cl. 123—486 **14 Claims**

1. A fuel injection control system for an internal combustion engine equipped with one of a manual and an automatic transmission, said internal combustion engine being delivered different amounts of fuel by fuel injection means according to engine operating conditions, said fuel injection control system comprising:

fuel increasing means for causing said fuel injection means to increase the amount of fuel delivered to the engine when the engine operates in a specific zone of engine operating conditions defined at least by engine speed;

engine operating condition detecting means for detecting a condition in which the engine operates;

control means for forcing, when said engine operating condition detecting means detects said condition remaining in said specific zone, said fuel increasing means to make said



increase in the amount of fuel with a predetermined time delay from a time said condition changes into said specific zone;

transmission judging means for judging a transmission in use with said internal combustion engine to be manual or automatic; and

zone expanding means for expanding said specific zone when said transmission judging means judges said transmission in use with said internal combustion engine to be automatic that said fuel increasing means, when said internal combustion engine operates in an expanded part of said specific zone, causes said fuel injection means to make said increase in the amount of fuel.

5,072,712

METHOD AND APPARATUS FOR SETTING A TANK VENTING VALVE

Ulrich Steinbrenner, Stuttgart; Günther Plapp, Filderstadt, and Wolfgang Wagner, Korntal-Münchingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE89/00137, § 371 Date Dec. 20, 1989, § 102(e) Date Dec. 20, 1989, PCT Pub. No. WO89/10472, PCT Pub. Date Nov. 2, 1989

PCT Filed Mar. 4, 1989, Ser. No. 455,427

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813220

Int. Cl.[5] F02D *41/14*; F02M *25/08*

U.S. Cl. 123—489 **17 Claims**

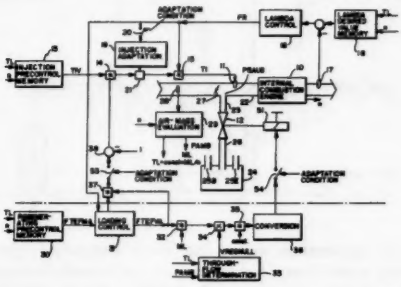
1. A method for obtaining output values for actuating a tank venting valve connected to the intake pipe of an internal combustion engine in a control system with a lambda control arrangement for controlling the lambda value of the air/fuel mixture to be supplied to the engine on the basis of a lambda control factor which influences the fuel metering device, the method comprising the steps of:

calculating the maximum possible gas flow (VREGNULL) through the tank venting valve at the pressure conditions present for a particular operating condition;

predetermining precontrol values of a variable, which is a measure of the required regenerating fuel quantity, in dependence on at least the air flow (ML) through the

intake pipe and the maximum gas flow (VREGNULL) through the tank venting valve;

modifying the precontrol values by dividing by a loading factor (FTEAD) and by controlling to the divided value, which loading factor is changed, starting with its present value, in dependence on the value of the lambda control factor (FR), in such a manner that it leads to a change in the regenerating fuel quantity to be output, in the particular direction which results in a change in the lambda control factor towards a control factor desired value;



converting the modified value into an output value for the tank venting valve; and,

reducing the output value (TI) to be supplied to the fuel metering device for reducing the quantity of fuel supplied to the internal combustion engine by this device in comparison to the state in which no fuel is supplied via the tank venting valve, in each case to such an extent that the fuel metering device essentially supplies to the internal combustion engine that quantity of fuel less by which the supply via the tank venting valve is increased.

5,072,713

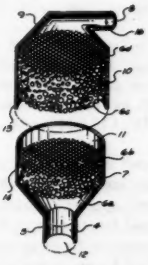
FILTER FOR LOWERING HARMFUL CRANKCASE EMISSIONS IN AN INTERNAL COMBUSTION ENGINE

Theodore P. Sweeten, Paulden, Ariz., assignor to Ventures Unlimted Inc., Paulden, Ariz.

Continuation-in-part of Ser. No. 542,721, Jun. 25, 1990. This application Nov. 1, 1990, Ser. No. 607,586

Int. Cl.[5] F02M *25/00*

U.S. Cl. 123—573 **12 Claims**



1. In combination with a crankcase vent connected to an internal combustion engine, a device for separating harmful emissions, said device consisting of:

a housing unit;

an inlet for taking in crankcase emissions

a beveled surface for return of liquid portions of said crankcase emissions via said inlet;

silica beads to filter harmful crankcase emissions; and

viscous fluid coating said silica beads.

5,072,714

ARRANGEMENT FOR GENERATOR WINDINGS, ESPECIALLY IN IGNITION SYSTEMS

Jörgen Bengtsson, Svanskog, and Anders Ågren, ÅM åL all of Sweden, assignors to AB Svenska Eketromagneter, ÅmåL, Sweden

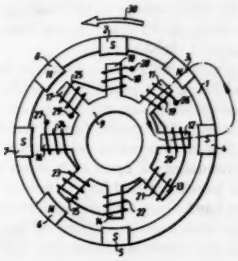
PCT No. PCT/SE89/00501, § 371 Date Mar. 1, 1991, § 102(e) Date Mar. 1, 1991, PCT Pub. No. WO90/03514, PCT Pub. Date Apr. 5, 1990

PCT Filed Sep. 19, 1989, Ser. No. 659,374

Claims priority, application Sweden, Sep. 20, 1988, 8803329

Int. Cl.[5] F02P *1/02, 3/06;* H02K *7/02*

U.S. Cl. 123—601 **1 Claim**



1. An arrangement in generators, in particular for ignition systems, characterized by a flywheel with magnet poles distributed thereon, said flywheel surrounding a magnet core stationary in relation to the path of poles and cooperating with the same, said core having several legs which are distributed in correspondence to the distribution of magnet poles and carry windings which are uniformly wound, preferably in one and the same working operation, and electrically form at least two groups, one or more of the groups comprising at least two windings so connected that the voltages induced at a uniform magnetic flux through their legs will cancel one another, the arrangement being further characterized in that at least one section of the magnet pole exhibits a magnetic unsymmetry, said one of the groups generating when passed by said section of the magnet pole path an induced voltage lower than the voltage induced by the second group, which voltages are arranged to control the ignition process of an associated internal combustion engine and, respectively, to charge a capacitor occurring in the ignition system, the second group having its windings interconnected such that they coact to create a sum voltage including induction from symmetrical as well as unsymmetrical parts of the magnet pole path.

5,072,715

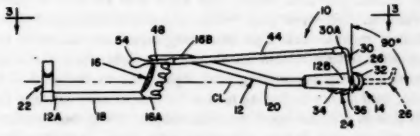
SLINGSHOT INCORPORATING IMPROVED FEATURES FOR INCREASED ENERGY STORAGE AND ENHANCED PERFORMANCE

David W. Barr, 223 La Fonda, Houston, Tex. 77060

Filed Apr. 25, 1990, Ser. No. 514,152

Int. Cl.[5] F41B *3/02*

U.S. Cl. 124—20.1 **27 Claims**



1. A slingshot, comprising:

(a) an elongated mainframe having opposite forward and rearward ends and including means for holding said mainframe by a user's hand;

(b) a fork assembly pivotally mounted to said forward end of

said mainframe about a transverse axis and including a flip-fork pivotally movable between an upright shooting position and a lowered neutral non-shooting position and means resiliently biasing said flip-fork to normally assume its neutral non-shooting position;

(c) means for holding a projectile; and

(d) an elastic power band connected to said flip-fork and having elongated portions extending therefrom to a pair of opposite ends connected to said holding means, said flip-fork being pivotally movable against the bias of said biasing means from said neutral non-shooting position to said upright shooting position upon stretching of said power band to load said slingslot for shooting the projectile such that, upon being moved to said upright shooting position, said flip-fork stores energy in said biasing means in addition to that being stored in said power band as the latter is stretched to load the slingshot;

(e) said flip-fork including a fork structure having a hollow interior and being composed of a middle bight portion pivotally mounted to said mainframe and a pair of arm portions connected to opposite ends of said bight portion and extending in transverse relation thereto, said arm portions terminating in open ends communicating with said hollow interior of said fork structure;

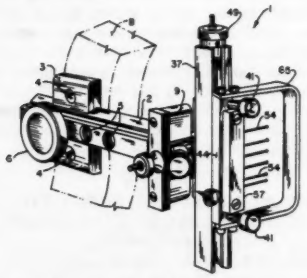
(f) said power band being a single continuous piece extending through said hollow interior of said middle bight portion and arm portions of said fork structure with said elongated portions of said band extending from said open ends of said arm portions of said fork structure so as to increase the amount of energy said band is capable of storing without increasing the lengths of said elongated band portions which extend from said fork structure.

5,072,716

ARCHERY BOW SIGHTING DEVICE

Donald R. Sappington, St. Charles County, Mo., assignor to Toxoric, Inc., O'Fallon, Mo.

Filed Jul. 30, 1990, Ser. No. 560,353
Int. Cl.[5] F41B *5/00*
U.S. Cl. 124—87 **2 Claims**



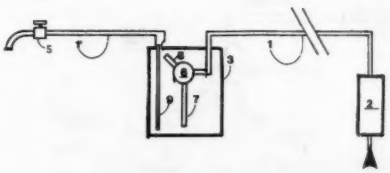
1. Means for temporarily holding sight pins in a preliminarily adjusted setting within a sight for an archery bow, wherein said sight is supported upon the archery bow, comprising a slide means provided within the sight and subject to lineal movement, said sight pins being adjustably supported upon said slide means, each sight pin being separately mounted for adjustable setting within its supporting sight upon the slide means, a clamp supporting said sight pins to the said slide means, said clamp including means for temporarily holding the sight pins in position upon the slide means during their preliminary setting and before clamping into their fixed position, wherein said means for temporarily holding said sight pins comprising a strip of magnetic material provided for holding the sight pins into their preliminary adjusted setting temporarily until clamped into fixed position by operation of the said clamp.

5,072,717

HOT WATER PRIMING DEVICE

Doerte Laing, Hofenerweg 37, D 7148, Remseck-2, Fed. Rep. of Germany; Karsten Laing, 3970 Honeycutt St., San Diego, Calif. 92109, and Ludwig Ludin, Kesselackerstrasse 23 CH, 5611 Anglikon, Switzerland

Continuation-in-part of Ser. No. 510,034, Apr. 16, 1990, abandoned, and a continuation of Ser. No. 844,206, Mar. 26, 1986, abandoned. This application Aug. 31, 1990, Ser. No. 575,985
Int. Cl.[5] F24D *17/00*
U.S. Cl. 126—362 **12 Claims**



1. In combination with a hot water distribution system wherein water from a hot water source is brought through a conduit to a hot water tap, a priming device which comprises:

a temporary storage reservoir having an inlet port and an outlet port in the upper region of the reservoir, and a capacity substantially commensurate with the capacity of said conduit;

said reservoir being placed in series with said conduit proximally to said tap;

means for continuously preventing heat loss through walls of said reservoir;

means for detecting the temperature of the water flowing through said inlet port;

means responsive to said means for detecting, for alternately directing water admitted through said inlet port toward an upper and a lower region of the reservoir; and

means for evacuating water from a lower region of the reservoir, said means for evacuating comprising a channel having an intake port in a lower region of the reservoir, and a discharge port proximate said outlet port in the upper region of the reservoir.

5,072,718

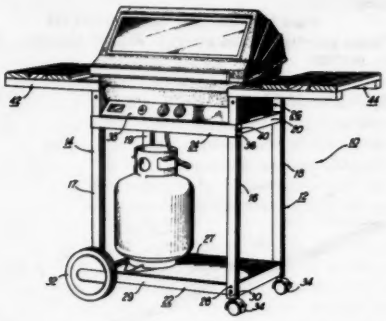
CART ASSEMBLY FOR BARBECUE GRILLS

John Seal, Auburn, Ala., assignor to W. C. Bradley Company, Columbus, Ga.

Continuation-in-part of Ser. No. 392,790, Aug. 11, 1989, Pat. No. 4,955,358. This application Jul. 17, 1990, Ser. No. 554,661
The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.
Int. Cl.[5] F24C *3/00*
U.S. Cl. 126—41 R **8 Claims**

1. A barbecue grill cart assembly comprising a pair of generally vertical leg member assemblies each having a front leg and a rear leg with spaced, opposing, generally horizontal strut means connected to said front and rear leg members for providing a generally rectangular frame structure, said strut means having an upper surface for receiving a barbecue grill, and a bottom shelf assembly for connecting said leg member assemblies and having a pair of spaced opposing strut members, one of said strut members extending between said front legs and other of said strut members extending between said rear legs, shelf means extending between said strut members and being secured thereto, at least one side shelf having spaced opposing rails with slat means spanning said rails for forming a shelf, said rails each having a proximal end with upper and lower elongated slots and said leg members having upper and lower pins

near the upper end thereof for engaging said slots and securing said shelf thereon, and securing means disposed through said



strut members and said leg members for fastening said leg member assemblies together near the lower ends thereof.

5,072,719

AIR SUPPLY SYSTEM FOR A FIREBOX

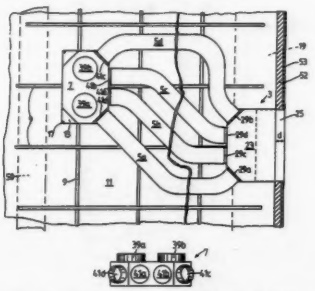
Hans Burger, Wydenstrasse 17, CH-3076 Worb, and Dieter Grimm, Mühlegasse 7, CH-3612 Steffisburg, both of Switzerland

Filed Oct. 23, 1990, Ser. No. 601,352

Claims priority, application Switzerland, Oct. 30, 1989, 3915/89

Int. Cl.[5] F24C *00/00*

U.S. Cl. 126—515 11 Claims



1. An air supply system in the ceiling of a building for feeding air to a firebox (2) within a building, comprising a fresh air intake box (3) in the outside wall (19) of the building, said box being provided with a plurality of pipe connection members (29*a*, 29*b*, 29*c*, 29*d*) and at least one air inlet port (38), a distributor box (7), said distributor box provided with a plurality of second pipe connection members (41*a*, 41*b*, 41*c*, 41*d*) and at least one air outlet port (39*a*, 39*b*), said distributor box being located in the proximity of the firebox (2), and a plurality of pipes (5*a*, 5*b*, 5*c*, 5*d*) in the ceiling of the building connecting said plurality of pipe connection members of said fresh air intake box (3) with said plurality of second pipe connection members of said distributor box (7).

5,072,720

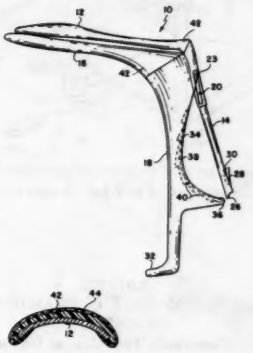
VAGINAL SPECULUM

Walter C. Francis, 1837 Kensington Dr., Hampton, Va. 23663, and E. William Francis, 1901 Woodfield Dr., Columbia, S.C. 29223

Filed Jan. 8, 1990, Ser. No. 461,626

Int. Cl.[5] A61B *1/32*

U.S. Cl. 128—17 3 Claims



1. A vaginal speculum comprising:

a first handle having an integral dilator blade angularly extending from one end thereof;

a second handle having an integral dilator blade angularly extending from one end thereof;

means for connecting said first and said second handles to position said blades in vertical slidable and pivotal contact with each other;

cushioning means disposed on each of said blades to minimize patient discomfort during vaginal examination and treatment;

said cushioning means including a silicone gel covering at least the surface of each of said dilator blades that are adapted to contact the patient; and

a polytetrafluoroethylene covering disposed about said silicone gel.

5,072,721

PATIENT REST FOR LITHOTRIPTER

Herbert Weiler, Alling; Peter Buchbauer, Garching, and Siegfried Hofsaess, Germering, all of Fed. Rep. of Germany, assignors to Dornier Medizintechnik, Munich, Fed. Rep. of Germany

Filed Apr. 24, 1990, Ser. No. 513,611

Claims priority, application Fed. Rep. of Germany, May 11, 1989, 3915381

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—24 EL 5 Claims

1. A lithotripter having a central housing for equipment pertaining to shockwave generation, further having a focusing equipment head movably connected thereto, the improvement comprising

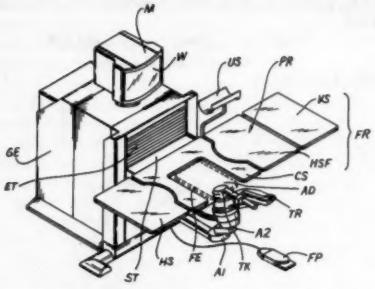
a patient rest having a central segment extending horizontally from and being mounted to said housing for up and down shifting, the segment being so mounted in cantilever fashion, and having an opening to serve as a treatment window;

a headrest removably attached to one side of the central segment;

a leg support structure removably attached to a side of the central segment being opposite to the side of said central segment to which the head rest is attached; and

said leg support structure being of a two part construction, a

first part being similar to said headrest, and a second part being an extension segment, removably attached to a side



of the first part that is opposite to a side of said first part where the first part is attached to said central segment.

5,072,722

DEVICE FOR THE SPATIAL ULTRASONIC LOCATION OF CALCULI

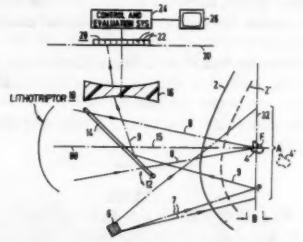
Bernd Granz, Oberasbach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation of Ser. No. 350,716, May 11, 1989, abandoned. This application Oct. 17, 1990, Ser. No. 598,810

Claims priority, application Fed. Rep. of Germany, May 25, 1988, 3817726

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—24 EL **18 Claims**



1. In combination with a lithotriptor having a shock wave transmitter to generate an ultrasonic shock wave focused at a focus point, a device for the spatial location of concrements found in the body of a living thing, comprising:

an ultrasonic camera securely connected to the lithotriptor including: an ultrasonic transmitter generating an ultrasonic wave to be reflected by a volume part of the body; an acoustical beam-splitter arranged in the path of the ultrasonic shock wave and reflecting the ultrasonic wave reflected by said volume part of the body; an acoustical lens focusing the ultrasonic wave reflected by said volume part of the body; an ultrasonic receiver disposed in an image plane and having a plurality of transducer elements arranged in a matrix receiving the ultrasonic wave reflected by the volume part of the body, said camera working in a reflection mode, said camera having an object plane containing the focus point of the ultrasonic shock wave and forming the image of the object plane on the image plane, whereby the concrements can be located at the focus point of the ultrasonic shock wave emanating form the lithotriptor so that the concrements can be destroyed.

5,072,723

COUPLING STRUCTURE FOR LITHOTRIPTER

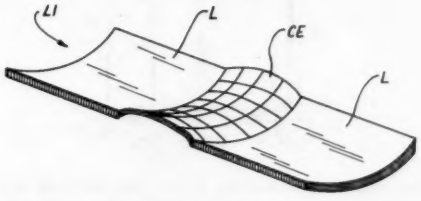
Thomas Viebach, Paehl, Fed. Rep. of Germany, assignor to Dornier Medizintechtik GmbH, Munich, Fed. Rep. of Germany

Filed May 30, 1990, Ser. No. 530,219

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1989, 3917858

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—24 EL **9 Claims**



1. In a lithotripter including a shockwave generator, the improvement comprising:

a coupling structure positioned and mounted for alignment with the shockwave generator and with shockwaves generated by the shockwave generator, said coupling structure being comprised of a stiff and rigid coupling surface element, said surface element being adapted to be interposed between the shockwave generator and a patient, the coupling surface element having a particular contour and no opening, but being permeable to shockwaves, the surface element being sufficiently stiff in order to not deform when urged against the patient, but contour-adapting the patient's skin to the contour of the surface element.

5,072,724

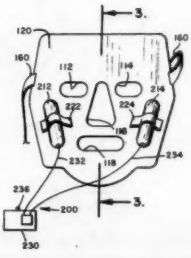
VIBRATIONAL LIQUID-WAVE STIMULATING THERAPY MASK APPARATUS FOR FACIAL HEALTH AND BEAUTY CARE

Joseph Marcus, 1507 36th Ave., Moline, Ill. 61265

Filed Nov. 23, 1990, Ser. No. 617,349

Int. Cl.[5] A61H *9/00*

U.S. Cl. 128—66 **18 Claims**



1. A vibrational liquid-wave stimulating therapy mask apparatus for facial health and beauty care comprising:

a. a molded unitary mask made of elastic material, a vibrating means and a wearing means;

b. said mask configured to substantially conform the general facial contour of a human face and completely cover the entire face of a user with openings corresponding to the respective locations and sizes of the eyes, nose and mouth of the user;

c. said mask having an interior layer shaped cavity and an exterior shell having an outward side, edge and inward

side surrounding said interior shaped cavity, where said interior forms a layer shaped cavity having a uniform thickness, and said exterior has an elastic outward side, an edge having a uniform width and an inward side with a very smooth surface;

d. said layer shaped cavity is inflated with liquid capable of transmitting vibrational waves;

e. said vibrating means including a pair of electric oscillators, a pair of mounting members, a pair of wires and a power unit with a switch, where the pair of electric oscillators is mounted on said elastic outward side of the exterior of said mask by the pair of mounting members at respective locations corresponding to the cheekbone area of the face of the user, and connected to the power unit by the pair of wires respectively; and

f. said wearing means is attached to said edge of the exterior of said mask at two opposite locations for holding said mask firmly against the face of the user such that said smooth surface of the inward side of the exterior of said mask is in smooth contact with the entire area of the face of the user;

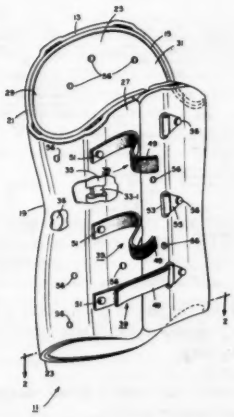
g. whereby vibration generated by said pair of electric oscillators is transmitted by said liquid contained within said layer shaped cavity in the form of liquid waves to said inward side and slightly damped, then through said smooth surface of the inward side to stimulate the entire superficial blood capillary system of the face of the user.

5,072,725

SOFT BODY BRACE

Marion E. Miller, Seaquay Condominiums, 4800 N. A-1-A, Unit 418, Vero Beach, Fla. 32963

Filed Apr. 27, 1990, Ser. No. 515,507
Int. Cl.[5] A61F *5/02*
U.S. Cl. 128—78 **13 Claims**



1. An unfinished soft body brace for engaging the trunk of a person for supportive purposes comprising:

a. an inner layer of soft compressible plastic material,

b. an outer layer of soft compressible plastic material bonded to the inner layer of soft compressible plastic material,

c. the inner and outer layers defining a shell having a split portion,

d. a plurality of flexible sleeves fixedly sandwiched between the outer and inner layers of soft compressible plastic material, and

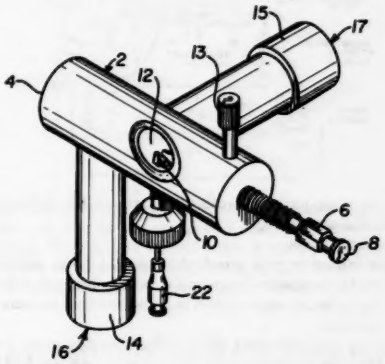
e. reinforcing stays slidably and removably mounted in the sleeves.

5,072,726

VAPORIZER FOR INHALATION ANESTHETICS DURING HIGH-FREQUENCY JET VENTILATION AND ASSOCIATED METHOD

Manoochehr Mazloomdoost, Lexington, Ky., and Wilfred L. Foon, Pittsburgh, Pa., assignors to University of Pittsburgh of the Commonwealth System of Higher Education, Pittsburgh, Pa.

Continuation of Ser. No. 107,224, Oct. 9, 1987, abandoned. This application May 11, 1990, Ser. No. 613,981
Int. Cl.[5] A61M *11/00*
U.S. Cl. 128—200.14 **33 Claims**



1. A vaporizer used for high-frequency jet ventilation comprising:

a main body portion defining a passageway that extends therethrough and having an open end connectable to an endotracheal tube,

a gas supply needle which extends into said passageway, and being operatively associated with a high-frequency jet ventilator for introducing said gas supply into said passageway of said main body portion at a desired frequency,

an inhalation anesthetic supply needle operatively associated with infusion pump means for introducing liquid inhalation anesthetic fluid into said inhalation anesthetic supply needle at a controlled flow rate, and

said inhalation anesthetic supply needle and said gas supply needle being disposed generally perpendicular relative to each other,

said arrangement and the construction of said inhalation anesthetic needle and said gas supply needle being such that when a jet of gas is introduced into said passage-way the high velocity of said gas produces a negative pressure which draws said inhalation anesthetic fluid out of said inhalation anesthetic supply needle and airblast atomization occurs at the point of intersection of said gas from said gas supply needle and said fluid from said inhalation anesthetic supply needle whereby said fluid is reduced to small fluid droplets, said airblast atomization immediately followed by vaporization due to the increased surface area of said small droplets and further contact of said jet of gas with said droplets of said inhalation anesthetic such that a vaporized substance with only a gas phase containing molecules of said inhalation anesthetic exists in said passageway of said vaporizer with a controllable percentage of an inspired anesthetic concentration, and

said construction of said passageway of said main body of said vaporizer being unobstructed along the path of travel of said vaporized gas such that said vaporized gas flows freely through said passageway out of said vaporizer into said endotracheal tube.

5,072,727

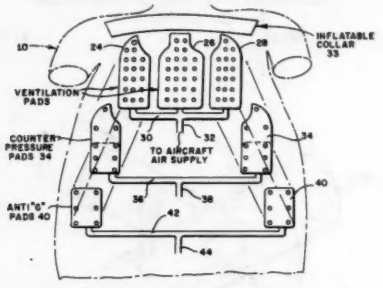
MULTI-PURPOSE JERKIN

Armand J. Aronne, Massapequa, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation of Ser. No. 202,636, Jun. 6, 1988, abandoned. This application May 10, 1990, Ser. No. 522,500

Int. Cl.[5] A62B *17/00*

U.S. Cl. 128—202.11 4 Claims



1. A multi-purpose protective garment for aviators and astronauts comprising:

a torso portion;

first inflatable pads attached inside the torso portion for exclusive positioning over a wearer's chest area for exerting pressure only thereon in a low ambient pressure environment;

second inflatable pads, distinct from the first pads, pressurized independently from the first pads and attached inside the torso portion for exclusive positioning over a wearer's abdominal area for exerting pressure only thereon when the wearer encounters high G forces; and

a third separately inflatable pad, distinct from the first and second pads, and attached exclusively inside the shoulder area of the torso portion for increasing the floatation of the garment only in an upright condition; and

forced air distributing means attached inside the torso portion for distributing forced air through the interior of the torso portion for increasing the comfort of the garment to a wearer.

5,072,728

RECIRCULATING RESPIRATOR

Adalbert Pasternack, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk AG, Lübeck, Fed. Rep. of Germany

Filed Sep. 7, 1990, Ser. No. 580,270

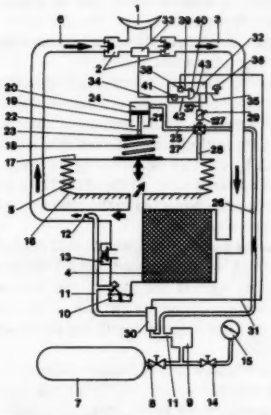
Claims priority, application Fed. Rep. of Germany, Sep. 12, 1989, 3930362

Int. Cl.[5] A61M *16/00;* A62B *7/00*

U.S. Cl. 128—204.18 11 Claims

1. A recirculating respirator for positive pressure operation, comprising:

a breathing circuit for supplying respiratory gas to a patient including an inhalation connection and an exhalation connection; over pressure means connected to said breathing circuit for generating an over pressure condition in said breathing circuit, said over pressure means being switchable between an over pressure condition and a normal condition; respiratory gas supply circuit connected to said breathing circuit including a respiratory gas supply line; flow rate measuring means, positioned in said respiratory gas supply line, for generating a signal representing rate flow in said respirator gas supply line; and, control unit means for receiving said respirator supply line flow rate signal, and connected to said over pressure means for switching said over pressure means between



said over pressure condition and said normal condition, dependent on said flow rate.

5,072,729

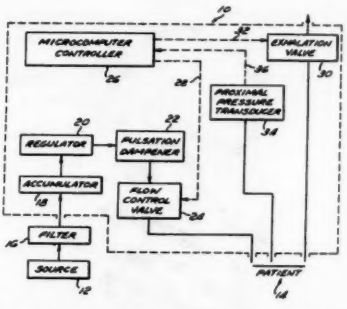
VENTILATOR EXHALATION VALVE

Douglas F. DeVries, Redlands, Calif., assignor to Bird Products Corporation, Riverside, Calif.

Continuation of Ser. No. 927,253, Nov. 4, 1986, abandoned. This application Nov. 21, 1989, Ser. No. 441,190

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—204.23 14 Claims



1. An apparatus for use in a ventilator system having an exhaust which provides artificial respiration to a patient, said apparatus comprising:

a stepper motor;

a shaft coupled to said stepper motor, said shaft being movable by said stepper motor;

a valve having means for coupling said valve to the exhaust of the ventilator system and means for connecting said valve to ambient air such that in a closed position no gas may flow through said valve from said means for coupling to said means for connecting and in a fully open position gas may flow through said valve from said means for coupling to said means for connecting;

means coupled to said shaft for directly translating motion of said shaft into movement of said valve to change the flow of gas through said valve; and

said valve includes means for providing a relatively low pressure gain when said valve is near its closed position

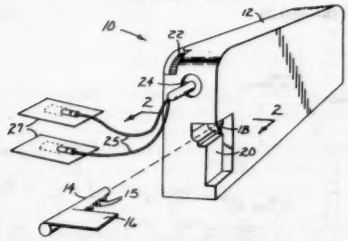
and for providing a relatively high pressure gain when said valve is near its fully open position.

5,072,730

KEY PROGRAMMED TRANSCUTANEOUS ELECTRIC STIMULATOR

John H. Lee, North Oaks, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 14, 1990, Ser. No. 538,154
Int. Cl.[5] A61N *1/36*
U.S. Cl. 128—421 10 Claims



1. A transcutaneous electrical stimulator, comprising:

a key having one or more wards thereon;

a housing having an aperture therein, said housing further having a keyway aligned with said aperture, said aperture being adapted to admit said key and said keyway being adapted to support and align said key;

means enclosed within said housing for generating therapeutic electrical impulses of electrical energy, said generating means being adapted to respond to a pattern of status conditions and responsively modify the electrical parameters of the electrical impulses;

means for delivering the electrical energy to a location for therapy; and

means enclosed within said housing adjacent said keyway for controlling said generating means wherein said controlling means communicates to said generating means at least some of the status conditions to which said generating means is responsive; wherein

when said key is inserted into said keyway and rotated, said ward contacts and actuates said controlling means.

5,072,731

APPARATUS FOR DETECTING CATARACTOGENESIS USING QUASIELASTIC LIGHT SCATTERING

Victor G. Taratuta, Boston; George M. Thurston, and George B. Benedek, both of Belmont, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 463,883, Jan. 8, 1990, Pat. No. 4,957,113, which is a continuation of Ser. No. 91,658, Sep. 1, 1987, abandoned. This application Sep. 17, 1990, Ser. No. 583,777
Int. Cl.[5] A61B *3/10*
U.S. Cl. 128—633 59 Claims

1. Apparatus for in vivo inspection of ocular tissue, comprising:

means for producing substantially monochromatic, coherent, collimated light;

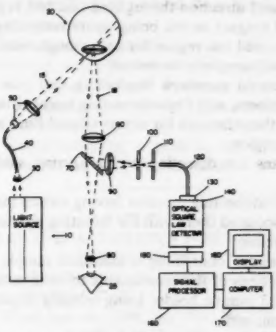
means for focusing the light on a specific measurement location of a subject's ocular tissue;

means for collecting the light scattered by the ocular tissue, the scattered light having an intensity subject to temporal fluctuations;

means for producing an electrical signal representative of the temporal fluctuations;

means for analyzing the electrical signal to measure the relative average intensity of the light scattered by slow moving protein aggregates in the ocular tissue (I_s) and the relative average intensity of the light scattered by fast moving protein species in the ocular tissue (I_f); and

means for locating the position of a first member of the group of measurements consisting of I_s, I_f, and their sum



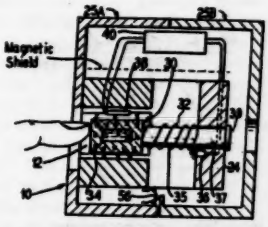
I_{tot} on a universal curve defined by the relationship of the first member of the group to a second member of the group, the position on the curve corresponding to the degree of cataractogenesis at the specific measurement location in the ocular tissue of the subject.

5,072,732

NMR INSTRUMENT FOR TESTING FOR FLUID CONSTITUENTS

Uri Rapoport, Oak Park, and Richard Panosh, Lisle, both of Ill., assignors to Advanced Techtronics, Inc., Chicago, Ill.

Continuation of Ser. No. 904,000, Sep. 4, 1986, Pat. No. 4,875,486. This application Oct. 23, 1989, Ser. No. 427,001 The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.
Int. Cl.[5] A61B *5/055*
U.S. Cl. 128—653.2 1 Claim



1. In a nuclear magnetic resonance spectroscopy apparatus for testing fluids for the presence of constituents, said apparatus being of the type in which a first magnetic field aligns ^1H protons to an initial position, and in which a second magnetic field is cyclicly energized and deenergized to cause alignment of the ^1H protons to a second position and realignment to said initial position, and in which the magnetic changes resulting during realignment are detected and analyzed, the improvement comprising:

first magnet means comprising a pair of permanent bar magnets each including a north pole and a south pole,

second magnet means for creating said second magnetic field, said second magnet means comprising a plurality of additively connected surface coils for both transmitting energization and sensing;

mounting means for mounting said first magnet means,

said mounting means comprising a pair of spaced apart members for positioning said pair of bar magnets space apart with the north pole of each said bar magnet secured

to one of said members and the south pole of each said bar magnet secured to the other of said members, said first magnet means, said second magnet means and said mounting means providing a cavity defining a test region therein for receiving a sample of the fluid to be tested,

said first magnetic field being substantially uniform in field strength and direction throughout said test region;

said second magnet means being operatively disposed with respect to said test region for being magnetically coupled to the fluid sample to be tested;

first and second members connecting said pair of spaced apart members, said first connecting member including an aperture therethrough for access of said fluid sample into said test region;

circuit means for detecting and analyzing said magnetic changes;

said second connecting member having switch means operatively associated therewith for initiating operation of said circuit means;

a sample holder containing a standard sample of known concentrations of the constituents to be investigated;

said standard sample holder being initially disposed in said test region; and

means for biasing said sample holder to urge said sample holder toward said second connecting member and to initially locate said standard sample in said test region and capable of being operatively coupled to said second magnet means when said second magnet means is energized;

said switch means being activated in response to the movement of said standard sample holder out of said test region to contact and operate said switch means when said fluid sample to be tested is moved into said test region.

5,072,733

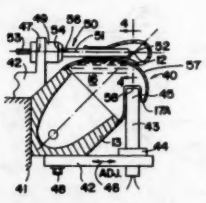
SHOCK WAVE LITHOTRIPTER AND METHOD FOR USING THE SAME

Avner Spector; Sylvia Rutiser, both of 5-0 Metropolitan Ct., Gaithersburg, Md. 20878, and Daniel Barnea, Tel Aviv, Israel

Filed Mar. 14, 1990, Ser. No. 493,398

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—660.03 **13 Claims**



1. A shock wave lithotripter comprising:

a) shock wave generating means for producing shock waves that are focused at a focus point remote from said shock wave generating means during operation of said lithotripter;

b) an ultrasound probe having a transducer for producing ultrasound beams defining a plane of radiation during calibration of said lithotripter;

c) probe mounting means mounting said probe relative to said shock wave generating means;

d) said mounting means being constructed and arranged to that the probe is spatially adjustable relative to said shock wave generating means during calibration and operation of said lithotripter for effecting illumination by said ultrasound beams of a region containing said focus point;

e) a focal point target having a fee end;

f) target mounting means mounting said target relative to said shock wave generating means such that said free end is positionable at said focus point; and

g) display means having a screen for displaying the plane illuminated by said ultrasound beams such that said free end of said target is visible on said screen.

5,072,734

PULSE DOPPLER MTI SYSTEM

Yasuhito Takeuchi, Tokyo, Japan, assignor to Yokogawa Medical Systems, Limited, Tokyo, Japan

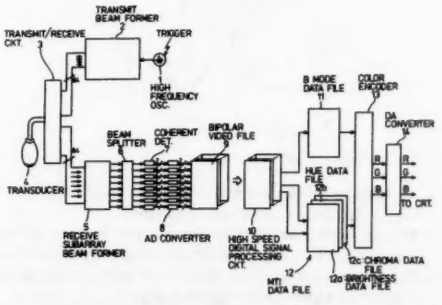
PCT No. PCT/JP88/00697, § 371 Date Jan. 11, 1990, § 102(e) Date Jan. 11, 1990, PCT Pub. No. WO89/00402, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 14, 1988, Ser. No. 457,775

Claims priority, application Japan, Jul. 14, 1987, 62-175629

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—660.05 **2 Claims**



1. In a pulse Doppler MTI system capable of simultaneously performing a B-mode display and an MTI display using format based on multi-beam scanning, the improvement comprising

video storage means comprising a plurality of frames, for storing bipolar video data, obtained by coherent detection, in one of said plurality of frames for each scan;

means for eliminating fixed target components from data entered in said plurality of frames;

processing means for two-dimensional cross-correlating data stored in adjacent frames;

arithmetic means for obtaining a kinetic vector within a frame plane from output signals from said processing means; and

coloring means for displaying orthogonal components of said kinetic vector within said frame plane.

5,072,735

ULTRASONIC IMAGING APPARATUS

Takahisa Okazaki, Matsudo; Shinichi Okumoto, and Hirotaka Nakajima, both of Nishinasundmachi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 19, 1989, Ser. No. 367,835

Claims priority, application Japan, Jun. 21, 1988, 63-152832; Jun. 21, 1988, 63-152833; Jun. 21, 1988, 63-152834; Jun. 21, 1988, 63-152835

Int. Cl.[5] A61B *8/00*

U.S. Cl. 128—660.07 **14 Claims**

1. An ultrasonic imaging apparatus comprising:

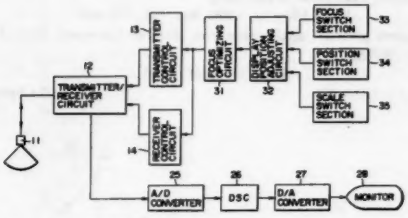
ultrasonic transducer means for propagating ultrasonic beams toward a subject, and converting echo beams reflected from the subject into an echo signal;

focus setting means for setting a plurality of focal depths;

delay control means connected to said focus setting means, for outputting a plurality of delay signals corresponding to a plurality of the focal depths, said delay control means including means for detecting a central portion of a display range, means for changing the focal depths set by said focus setting means to a plurality of new focal depths corresponding to a plurality of locations within the display range and near the central portion of the display

range, and means for outputting a new plurality of delay signals corresponding to the new focal depths;

transmitter/receiver means connected to said ultrasonic transducer means and said delay control means, for driving said ultrasonic transducer means in accordance with



the delay signals to scan the subject in a multi-focusing manner, and for processing the echo signal output from the ultrasonic transducer means; and

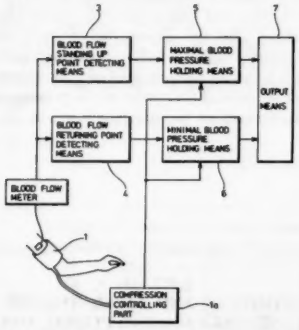
display means connected to said transmitter/receiver means, for displaying a B-mode image based on the echo signal supplied from said transmitter/receiver means.

5,072,736

NON-INVASIVE AUTOMATIC BLOOD PRESSURE MEASURING APPARATUS

Keikitsu Ogawa, Tokorozawa; Takeda Sunoa, both of Ichikawa; Mitsushi Hyogo, Niiza, and yoshinki Shindo, Higashikurume, all of Japan, assignors to Nihon Kohden Corporation, Tokyo, Japan

Filed Jan. 19, 1990, Ser. No. 467,780
Int. Cl.[5] A61B 5/02
U.S. Cl. 128—680 **2 Claims**


BLOOD FLOW STANDING UP POINT DETECTING MEANS
MAXIMAL BLOOD PRESSURE HOLDING MEANS
OUTPUT MEANS
BLOOD FLOW RETURNING POINT DETECTING MEANS
MINIMAL BLOOD PRESSURE HOLDING MEANS
BLOOD FLOW METER
COMPRESSION CONTROLLING PART

1. A non-invasive automatic blood pressure measuring apparatus comprising:

a measuring cuff adapted for decompression after compression and attachment to a part of a body, the measuring cuff having a proximal side and a distal side;

a blood flow meter non-invasively detecting the blood flow of the arteries on the proximal or distal side of said cuff.

a moving average blood flow signal detecting means calculating a moving average blood flow signal from the blood flow of the arteries on the proximal or distal side of said cuff, the average blood flow signal detecting means calculating a 1% average blood flow signal value representative of a blood flow standing up point and a 99% average blood flow signal value representative of a blood flow returning point;

a blood flow standing up point detecting means monitoring blood flow to detect the 1% average blood flow signal value during a decompression process of internal pressure on said cuff;

a blood flow returning point detecting means monitoring the blood flow to detect the 99% average blood flow signal value during a further decompression process of internal pressure on said cuff;

a maximal blood pressure holding means storing a maximal blood pressure value corresponding to the internal pressure in said cuff when the 1% average blood flow signal value is detected by the blood flow standing up point detecting means;

a minimal blood pressure holding means storing a minimal blood pressure value corresponding to the internal pressure in said cuff when the 99% average blood flow signal value is detected by the blood flow standing up point detecting means; and

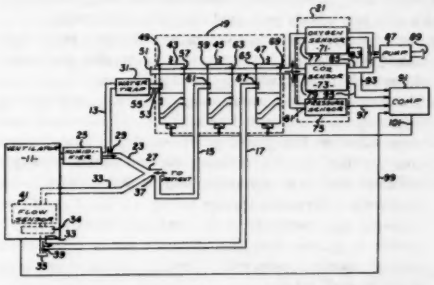
an output means indicating or printing out the stored maximal and minimal blood pressure values.

5,072,737

METHOD AND APPARATUS FOR METABOLIC MONITORING

Peter Goulding, San Diego, Calif., assignor to Puritan-Bennett Corporation, Carlsbad, Calif.

Filed Apr. 12, 1989, Ser. No. 336,724
Int. Cl.[5] A61B 5/08
U.S. Cl. 128—718 **19 Claims**



1. A metabolic monitor for providing metabolic rate data obtained from inspiration and expiration gases of a patient intubated on a ventilator having an inspiration conduit for providing the inspiration gases from the ventilator to the patient, an expiration conduit for conducting the expiration gases from the patient to the ventilator, said expiration conduit having an exhalation valve in fluid communication with the expiration conduit and an exhaust port of the ventilator in fluid communication with the ambient atmosphere and the exhalation valve for venting the expiration gases to the ambient atmosphere, the monitor comprising:

a first sample conduit means in fluid communication with the inspiration conduit for collecting a sample of the inspiration gases as provided by the ventilator;

a second sample conduit means in fluid communication with the expiration conduit for collecting an end-tidal sample of expiration gases as exhaled by the patient;

a third sample conduit means in fluid communication with the exhalation valve and the exhaust port for collecting an ambient pressure sample of the expiration gases from a point prior to complete mixing of the gases exhaled in adjacent breaths and such that the pressure is essentially ambient room air pressure;

selector means in fluid communication with the first, second and third sample conduit means for receiving said gas samples, and for selecting one of the gas samples for analysis; and

sensor means in fluid communication with said selector means for receiving a selected one of said gas samples, and operative to provide a signal indicative of a parameter of

the selected gas sample related to metabolic rate of the patient.

5,072,738

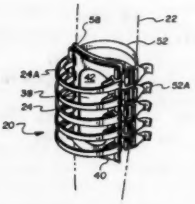
APPARATUS FOR PROTECTION A WOUND

Terry M. Wonder, Holladay; Joseph T. Sorenson, Murray; Garlyn W. Hendry, and Lawrence A. Neer, both of Salt Lake, all of Utah, assignors to Sorex Medical, A Division of Sorenson Development, Inc., Salt Lake City, Utah

Continuation of Ser. No. 339,208, Apr. 14, 1989, abandoned. This application Sep. 17, 1990, Ser. No. 585,038

Int. Cl.[5] A61F *13/00*

U.S. Cl. 128—888 22 Claims



1. Apparatus for providing a ventilated shielding over a skin region of a user's body part, said apparatus comprising:

a pair of support members separated a distance from each other and adapted for approximately parallel placement from each other straddling said skin region;

a plurality of resilient arcuate cage members each having opposing ends connected to said support members, said cage members being arranged parallel and spaced from one another thereby defining air circulation passages between said cage members, said cage members being resiliently deformable springs having a relaxed condition wherein said members have a relaxed effective length which is greater than said distance and a compressed arched condition inducible by urging said opposing ends towards each other;

position maintenance means connecting said support members and extending adjacent said skin region for maintaining said support members in relative positions separated by said distance, thereby urging said opposing ends of said cage members toward each other and inducing said cage members to said compressed condition; and

attachment means adapted to extend away from said cage members and encircle said user's body part for attaching said cage members to said user's body part above said skin region with said support members held against said user's body part.

5,072,739

ISCHEMIA-REPERFUSION TUMOR THERAPY

Angelo P. John, 106 Henry St., St. Green, Conn. 06830

Filed Jun. 5, 1991, Ser. No. 710,778

Int. Cl.[5] A61B *19/00*

U.S. Cl. 128—897 10 Claims

1. A method of treating solid tumors which comprises:

(a) occluding the supply of oxygenated blood to the tumor to be treated for a period sufficient to induce hypoxia in the tumor;

(b) reperfusing the tumor with the blood occluded in (a) for a period sufficient for oxygen-derived free radicals to form and effect reperfusion injury to the tumor; and

(c) repeating steps (a) and (b) until the desired degree of tumor remission is achieved.

5,072,740

DEVICE FOR FILLING PREFABRICATED CIGARETTE TUBES, ESPECIALLY FILTER TIPPED CIGARETT TUBES

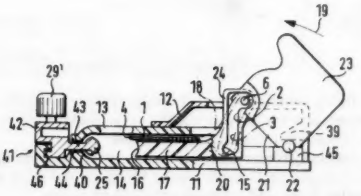
Klaus G. Gätschmann, and Gunter Schütze, both of Trossingen, Fed. Rep. of Germany, assignors to Efka-Werke Fritz Kiehn GmbH, Fed. Rep. of Germany

Filed May 21, 1990, Ser. No. 526,903

Claims priority, application Fed. Rep. of Germany, May 22, 1989, 3916589

Int. Cl.[5] A24C *5/06*

U.S. Cl. 131—75 15 Claims



1. In a device for filling prefabricated cigarette tubes including filter-tipped cigarette tubes and having a free cross-section of a tobacco accommodating volume including an elongated tobacco pressing chamber (**14**) with a side filling opening (**13**) for receiving tobacco to be compressed and forming a tobacco rod (**10**) by means of a pressing beam (**17**) movable transversely to the longitudinal direction of the tobacco pressing chamber (**14**) and across said filling opening for compressing the tobacco into a tobacco rod, a socket coupled to the pressing chamber and having means for fitting the cigarette tube on the socket, and an ejector (**25**) for ejecting the tobacco rod (**10**) from the pressing chamber (**14**) into the cigarette tube, comprising the improvement including a movable lid (**1**) mounted for movement over said filling opening (**13**) of the tobacco pressing chamber (**14**) for closing and opening said filling opening and thereby defining a closed chamber, and means to move the lid in a closing movement of said lid with the leading portion of the lid located forwardly of the pressing beam (**17**) during the movement of the pressing beam in the pressing direction.

5,072,741

METHOD OF AND APPARATUS FOR SIMULTANEOUSLY MAKING PLURAL TOBACCO FILLER STREAMS

Uwe Heitmann, Hamburg, Fed. Rep. of Germany, assignor to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jan. 15, 1991, Ser. No. 641,545

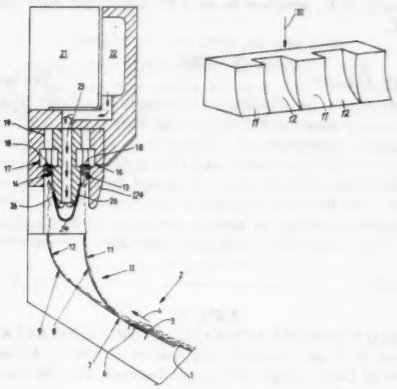
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1990, 4001285

Int. Cl.[5] A24C *5/18*

U.S. Cl. 131—84.1 21 Claims

1. A method of simultaneously producing a plurality of tobacco filler streams for transformation into the fillers of cigarette rods and the like, comprising the steps of gathering particles of tobacco into a first layer having a first width and advancing the layer in a predetermined direction along a predetermined path defined by a substantially concave first surface; maintaining the layer in close proximity of the first surface during advancement in said direction; breaking up the layer into a plurality of second layers having a second width and into a plurality of third layers having a third width and alternating with said second layers; conveying at least said

third layers along second surfaces which are offset relative to said first surface; converting the second layers into a first



continuous filler stream; and converting the third layers into a second continuous filler stream.

5,072,742

METHOD OF AND APPARATUS FOR MAKING A FILLER OF SMOKABLE MATERIAL

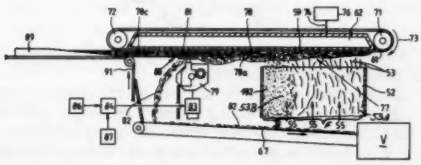
Uwe Heitmann, Hamburg, Fed. Rep. of Germany, assignor to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Mar. 18, 1991, Ser. No. 671,128

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1990, 4009381

Int. Cl.[5] A24C *5/18*

U.S. Cl. 131—84.3 **20 Claims**



1. A method of producing a continuous rod-like filler from particles of smokable material, comprising the steps of establishing and maintaining a supply of smokable material; continuously drawing a first layer of material from said supply and transporting the first layer in a predetermined direction along an elongated path wherein the first layer has two marginal portions; converting in a first portion of said path successive increments of the first layer into successive increments of a relatively narrow and tall stream which contains a surplus of smokable material; removing the surplus from the stream in a second portion of said path downstream of said first portion so that the remainder of the stream constitutes a continuous filler; and returning the removed surplus into a third portion of said path upstream of said first portion and at one marginal portion of the first layer so that the returned surplus forms a second layer along the first layer and reenters the first portion of said path.

5,072,743

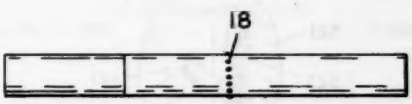
BARRIERIZED CIGARETTE

Charles P. Perrine, 2534 Terrace Rd., Fort Wayne, Ind. 46805

Continuation of Ser. No. 925,429, Jul. 17, 1978, abandoned. This application Dec. 31, 1981, Ser. No. 336,443

Int. Cl.[5] A24B *3/02*

U.S. Cl. 131—360 **20 Claims**



1. A cigarette wherein the improvement comprises means for discouraging the smoking of said cigarette beyond a predetermined point, said means comprising at least one hole in said cigarette's original enwrapment paper, said hole being located intermediate the ends of said cigarette's shaft and being of sufficient impairment to the cigarette's smokability as to discourage smoking of the cigarette when said hole shall be uncovered and exposed, said hole being covered and unexposed at manufacture by a spirally winding narrow band of second layer enwrapment paper restoring smokability of the cigarette, said band being secured to the cigarette only at its rearwardmost and forwardmost termini such that when the burn of the cigarette shall reach the forwardmost terminus of said band said band, its forwardmost anchorage to the cigarette being then destroyed and removed, shall then recoil and unwind rearwardly, thus exposing said hole in said original enwrapment paper and causing said cigarette to be no longer a satisfactory article for smoking, said forwardmost terminus of said band being located on the cigarette at a point, removed from said cigarette's inhaling end by distance equal to at least $\frac{1}{4}$ said cigarette's total length and removed from said cigarette's lighting end by distance equal to at least $\frac{1}{4}$ said cigarette's total length.

5,072,744

RELATING TO THE MAKING OF SMOKING ARTICLES

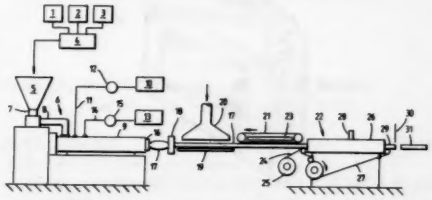
John A. Luke, Eastleigh; Paul D. Case, Southampton, and Stephen R. Hemsley, Romsey, all of England, assignors to British-American Tobacco Company Limited, London, England

Filed Jun. 5, 1990, Ser. No. 533,382

Claims priority, application United Kingdom, Jun. 23, 1989, 8914508

Int. Cl.[5] A24B *15/12*

U.S. Cl. 131—375 **10 Claims**



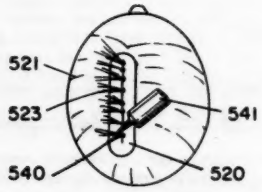
1. A method of making a smoking article rod, wherein a mixture of particulate tobacco and binder, with the addition of water, is extruded through an exit orifice of an extruder die, to provide a rod form monolithic extrudate, under such extrusion conditions that said extrudate assumes a cross-section greater than that of the exit orifice of the extruder die, said extrudate in the plastic phase thereof is drawn down and has a cellular structure which is of an axially elongated conformation and lengths of said extrudate provide said smoking rod.

5,072,745

HAIR EXTENSION PROCESS

Byung J. Cheh, 2361 Achilles Dr., Los Angeles, Calif. 90046

Filed Jun. 29, 1990, Ser. No. 545,594
Int. Cl.[5] A41G 3/00
U.S. Cl. 132—201 9 Claims



6. A process for enhancing the appearance of hair on a person's head comprising the steps of:

obtaining a plurality of loose hairs;

applying a primary adhesive to one end of each of said loose hairs;

joining said plurality of loose hairs to a common strand;

applying the adhesive to said strand,

placing a shield over the existing hair on a person's head;

pulling at least one existing hair on a person's head through an opening in said shield;

melting the adhesive on said strand and attaching said strand to the existing hair; and

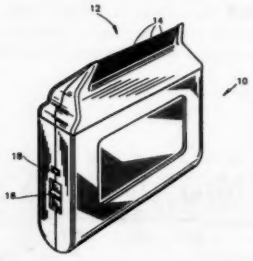
applying a protective sealant over the adhesive.

5,072,746

HAIR GROOMING DEVICE

Isaak Kantor, Rosh Pina, Israel, assignor to Epilady International Inc., New York, N.Y.

Filed Mar. 28, 1991, Ser. No. 676,802
Claims priority, application Israel, Apr. 4, 1990, 94005; Jun. 26, 1990, 94868
Int. Cl.[5] A45D 24/00
U.S. Cl. 132—219 20 Claims



1. A hand-held hair grooming device comprising:

a housing adapted to be heid in a hand of a user;

an array of electrically conductive tines defining a comb extending outwardly from the housing for engagement with hair;

means for mounting the tines in the housing; and

means for applying an electric potential between adjacent tines whereby lice and other pests suitably disposed between adjacent tines are electrocuted.

5,072,747

APPARATUS AND METHOD FOR CLEANING TUBULAR ARTICLES

John W. McCoy, Elmwood Park, N.J., and Wayne Steenrod, Monroe, N.Y., assignors to Avon Products, Inc., New York, N.Y.

Filed May 26, 1989, Ser. No. 356,960
Int. Cl.[5] B08B 9/02
U.S. Cl. 134—48 15 Claims

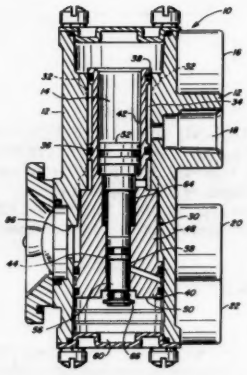
1. Apparatus for cleaning a multiplicity of tubular articles comprising a washing station, a drying station, means for conveying said multiplicity of tubular articles from said washing station to said drying station, said drying station having means associated therewith for applying heated air against said articles in a first direction, and said drying station having further means for applying a vacuum against said articles in a second direction simultaneously during the application of said heated air.

5,072,748

FLUID PRESSURE OPERATED INDICATING RELAY

William B. Gripe, Concord, and Andrew Y. Cheng, Alameda, both of Calif., assignors to Amot Controls, Inc., Richmond, Calif.

Filed Apr. 5, 1991, Ser. No. 681,562
Int. Cl.[5] G05D 16/10
U.S. Cl. 137—102 8 Claims



1. A fluid pressure operated indicating relay, said indicating relay comprising, in combination:

a casing defining an interior, an input port to direct pressurized fluid into said casing interior, an output port for directing pressurized fluid from said casing interior to a first predetermined location, a trip port leading from said casing interior, and a vent port for venting pressurized fluid from said casing interior;

a valve assembly mounted for movement in said casing interior between a first position wherein communication is established between said input port and said output port to direct pressurized fluid entering said casing interior from said input port outwardly through said output port and a second position wherein said input port and said output port are not in communication and wherein communication is established between said output port and said vent port to vent pressurized fluid from said output port through said interior and said vent port, said valve assembly moving from said first position to said second position responsive to a decrease of fluid pressure at said trip port, and said valve assembly including valve assembly return preventing means responsive to a decrease of fluid pressure at said input port below a predetermined level of magnitude for preventing said valve assembly from re-

turning from said second position to said first position resulting from fluid pressure at said trip port until fluid pressure at said input port reattains said predetermined level of magnitude.

5,072,749

DIFFERENTIAL PRESSURE REGULATOR

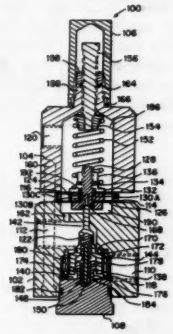
Jone Y. Ligh, P.O. Box 420509, Houston, Tex. 77242-0509

Continuation-in-part of Ser. No. 630,570, Dec. 20, 1990, which is a continuation of Ser. No. 554,550, Jul. 19, 1990, Pat. No. 4,991,620, which is a continuation of Ser. No. 352,619, May 15, 1989, abandoned, which is a continuation of Ser. No. 213,928, May 15, 1989, abandoned. This application Jan. 28, 1991, Ser. No. 646,212

The portion of the term of this patent subsequent to Nov. 26, 2005, has been disclaimed.

Int. Cl.[5] G05D *16/06*

U.S. Cl. 137—116.5 **10 Claims**



1. A differential pressure regulator comprising:

(a) a valve body having inlet and outlet ports in fluid communication with each other through a flow chamber;

(b) a pressure balanced spindle of single piece construction slidably mounted within said flow chamber and biased to seat within said flow chamber to block fluid communication therethrough, said pressure balanced valve spindle comprising three axially aligned and connected cylindrical segments of decreasing diameter, the first and largest diameter segment defining a lower seating and guide chamber therein and having an internal annular groove to receive a first O-ring seal, the second segment defining a spring receptacle chamber therein and having a bore normal to and through said second segment and said spring receptacle chamber, the third and smallest diameter segment defining an actuator stem which is in contact with a diaphragm assembly, and an external annular groove between said first and second segments to receive a second O-ring seal;

(c) said diaphragm assembly mounted on said body and in contact with said spindle to press on and unseat said spindle in response to forces acting on said diaphragm assembly, said diaphragm assembly being in fluid communication with said outlet port;

(d) a spring bonnet mounted on said body above said diaphragm assembly having a bias pressure feed-back port in fluid communication with said diaphragm assembly and containing an adjustable biasing spring in contact with said diaphragm assembly to provide a force additive to that provided by pressure entering said bias pressure feed-back port; and

(e) vent means through said diaphragm assembly which acts in response to fluid vapor pressure from said outlet port which is higher than the force of said adjustable biasing spring and pressure entering said bias pressure feed-back port.

5,072,750

FIRE HYDRANT CLOSURES

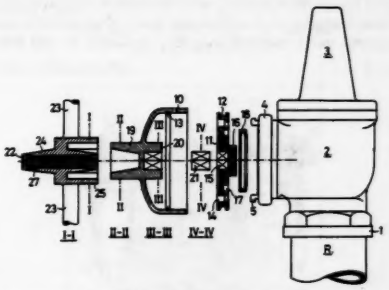
Ariah Poms, and Yaacov Poms, both of 18 Messilat Wolfson, Tel Aviv, Israel

Filed Jul. 5, 1990, Ser. No. 548,004

Claims priority, application Israel, Jul. 18, 1989, 91016

Int. Cl.[5] F16K *31/08, 35/16*

U.S. Cl. 137—296 **4 Claims**



1. Apparatus for safeguarding a fire hydrant against an unauthorized taking of water from the fire hydrant, comprising:

a cap for covering an outflow port of the fire hydrant, said cap having a recess on an inner side thereof;

a septum-like plate having a recess therein, said septum-like plate being held within said cap and being freely-rotatable within said cap, while being fixed against axial movement relative to said cap;

a movable lock block being located between said cap and said septum-like plate, said movable lock block having a length which is greater than the depth of the recess of said septum-like plate and which is capable of being urged into the recess of said septum-like plate while occupying at least a portion of the recess of said cap so that said cap is able to be connected to said septum-like plate;

a first magnet being positioned at a far end of the recess of said septum-like plate and having a negative polarity which is capable of preventing said movable lock block from entry into the recess of said septum-like plate; and

a tool for locking and unlocking said cap onto the outflow port of the fire hydrant, said tool including a center member having a second magnet with a negative polarity which is greater than the negative polarity of said first magnet so that said tool is able to lock said cap to the outflow port of the fire hydrant by urging said movable lock block into the recess of said septum-like plate.

5,072,751

VALVE ASSEMBLY

I-Chien Lin, No. 17-3, Chin-Hua St., Taipei, Taiwan

Filed Mar. 28, 1991, Ser. No. 677,634

Int. Cl.[5] F16K *31/26*

U.S. Cl. 137—429 **4 Claims**

1. A valve assembly comprising:

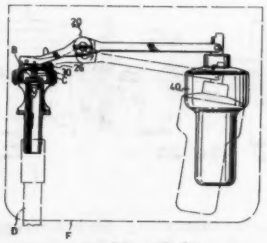
a tubular member including a first open end and a second open end;

a hollow case connected to said second open end of said tubular member, said case having a through hole aligned with said second open end of said tubular member and an opening communicating the interior and exterior of said case, a plate member connected to said second open end in said case to close said second open end, said plate member having a hole communicating with said second open end, said hole of said plate member having a diameter smaller than the inner diameter of said second open end;

a linkage having a first end, pivotally connected to said hollow case, and a second end; said linkage extending across and spaced from the through hole in the casing; and compression spring means positioned between said linkage and said casing located on the casing diametrically opposite the pivotal connection of the linkage to the casing for damping pivotal movement of the linkage;

a float pivotally connected to said second end of said linkage, in such a manner that it can rotate said linkage about said first end of said linkage in a first direction and an opposite second direction; said float comprising upper and lower hollow cylindrical float sections wherein said upper float section has a larger diameter and smaller height than said lower float section, with the center of gravity of the float being located within said lower float section; and

a control valve member movably mounted in said tubular



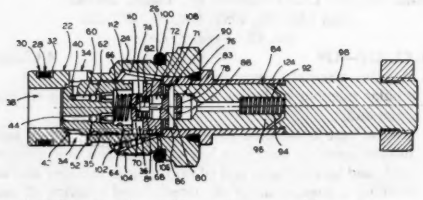
member, said control valve member including a rod which has a first end and a second end, and a core member which has a flat base connected to said first end of said rod, the cross-section of said rod being smaller than the cross-section of said flat base of said core member, the cross-section of said flat base of said core member being smaller than the inner diameter of said tubular member, said second end of said rod passing through said second pen end of said tubular member and said through hole of said case, said second end of said rod being pivotally connected to said linkage between said first end of said linkage and said spring means, said one core member of said control valve member being moved to close said hole of said plate member when said linkage is actuated by said float to rotate in said first direction and to open said hole of said plate member when said linkage is actuated by said float to rotate in said second direction.

5,072,752

BIDIRECTIONAL CARTRIDGE VALVE

Abel E. Kolchinsky, Riverwoods, Ill., assignor to Sterling Hydraulics, Inc., Schaumburg, Ill.

Filed Mar. 14, 1991, Ser. No. 669,529
Int. Cl.[5] G05D *16/10*
U.S. Cl. 137—493 **15 Claims**



1. A bidirectional cartridge valve comprising:

a generally cylindrical valve housing including an end port and a side port each opening into an axial, cylindrical bore defining a valve chamber;

a flow control element movable in said valve chamber between a valve open position to open a flow path between the two ports and a valve closed position to block the flow path between the two ports, said flow control element including a first passage provided with a first check valve connecting said end port with said valve chamber and a second passage with a second check valve connecting said side port with said valve chamber;

a cylindrical pilot seat in said chamber including a partial, axial bore defining a pilot chamber and an opening through said seat connecting said valve chamber with said pilot chamber;

a third passage through said valve housing, provided with a third check valve, connecting said pilot chamber to said side port;

a fourth passage through said valve housing, provided with a fourth check valve, connecting said pilot chamber to said end port; and

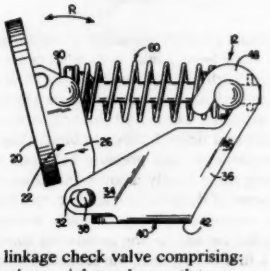
a pilot valve movable in said pilot chamber between a pilot valve open position to open a flow path between said valve chamber and said pilot chamber whereby fluid pressure at either of said two ports causes said flow control element to move to the valve open position, and a pilot valve closed position to block a flow path between said valve chamber and said pilot chamber whereby fluid pressure in said valve chamber exceeds fluid pressure at both said ports to maintain said flow control element in said closed position.

5,072,753

TOGGLE LINKAGE CHECK VALVE

Rand H. Ackroyd, Methuen, Mass., assignor to Watts Regulator Company, Lawrence, Mass.

Filed Jan. 22, 1991, Ser. No. 644,434
Int. Cl.[5] F16K *15/03*
U.S. Cl. 137—527 **9 Claims**



1. A toggle linkage check valve comprising:

a housing having an inlet and an outlet;

a sealing plug disposed within said housing and adapted for movement between a first, closed position for preventing flow of liquid between said inlet and said outlet, and a second, open position for substantially permitting flow of liquid between said inlet and said outlet; and

a spring assembly removably disposed within said housing, said sealing plug mounted upon said spring assembly, said spring assembly comprising a rod member and a means for biasing said rod member toward said sealing plug,

in said first position of said sealing plug, said rod member lying substantially perpendicular to a plane of said sealing member across said inlet, and

in said second position of said sealing plug, said rod member lying at an acute angle to said plane of said sealing member, with said means for biasing acting upon said rod member to apply, to said sealing plug, a biasing force of a second degree less than said first degree, whereby said spring assembly acts upon said sealing plug to provides a maximum resistance against liquid flow from said inlet toward said outlet when said sealing plug is in said first, closed position and a lesser resistance against liquid flow when said sealing plug is in said second, open position.

5,072,754

MOUNTING ARRANGEMENT OF A FLOW TARGET PLATE OF A FLUIDIZED-BED REACTOR

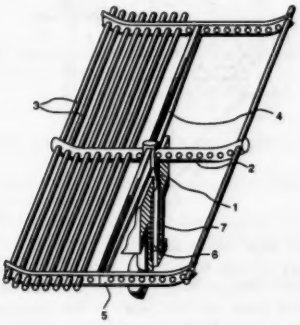
Heinz Haacker, Kreuztal; J. Ernst Malik, and Rainer Schmidt, both of Oberhausen, all of Fed. Rep. of Germany, assignors to MAN Gutehoffnungshütte Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Nov. 28, 1990, Ser. No. 618,295

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1990, 4000718

Int. Cl.[5] B01F *3/00*

U.S. Cl. 137—561 A 2 Claims



1. A flow target plate for a fluidizing medium in a horizontal fluidized-bed reactor including fluidizing medium supply lines, collectors and flow admission tubes, the target plate being mounted a passage of the fluidizing medium supply line in a tank socket of the reactor, comprising:

a first collector and a second collector; flow admission tubes connected on each side, with respect to a longitudinal direction of the reactor, of each of said collectors, said collectors extending in a circumferential direction of said reactor; at least one cross beam connected to ends of said flow admission tubes; and, longitudinal beams connected to the supply line, said longitudinal beams supporting said cross beams.

5,072,755

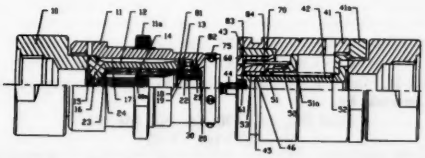
QUICK DISCONNECT COUPLING

Wayne E. Wilcox, Union City, Pa., assignor to Snap-Tite, Inc., Erie, Pa.

Filed Jun. 14, 1990, Ser. No. 538,147

Int. Cl.[5] F16L *29/00*

U.S. Cl. 137—614.03 5 Claims



1. A coupling comprising

a coupling half with a coupler fluid port in a coupler port bearing member, a coupler valve sliding over said port, first and second metal seals on opposite sides of said coupler port, said metal seals sealing between said coupler port bearing member and said coupler valve;

a nipple half with a nipple fluid port in a nipple port bearing member, a nipple valve sliding over said port, third and fourth metal seals on opposite sides of said nipple port, said metal seals sealing between said nipple port bearing member and said nipple valve;

said coupler and nipple valves being retracted in the connected mode and said coupler and nipple ports being in communication; and

locking means between said nipple half and said coupler valve, said locking means tending to insure that said coupler valve is returned to a sealing position over its port upon disconnection of said coupling.

5,072,756

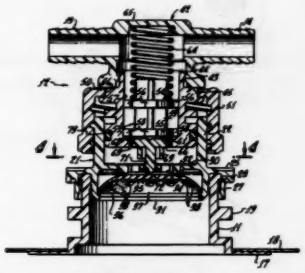
VALVE ASSEMBLY FOR FLUID LINE CONNECTION

Richard F. Carr, Lomita, Calif., assignor to Scholle Corporation, Irvine, Calif.

Filed Jan. 25, 1991, Ser. No. 646,536

Int. Cl.[5] F17D *1/08*

U.S. Cl. 137—614.04 8 Claims



7. A normally closed valve assembly for discharging liquid from a container comprising

a first valve unit including

a first tubular body having a transverse wall and an opening through said wall,

and a diaphragm having a portion engaging one side of said wall around said opening so as to prevent fluid flow through said opening,

said diaphragm having opening means therethrough outside said portion thereof,

a second valve unit including

a second tubular body having an inlet opening and an outlet opening, and a valve seat adjacent said inlet opening,

a movable member in said second tubular body, and resilient means biasing said movable member toward said seat so that a portion of said movable member adjacent one end thereof engages said seat for closing said inlet opening of said second tubular body, and

means for interconnecting said first and second valve units so that said first and second tubular bodies are advanced relatively toward each other,

said movable member being relatively advanced toward said transverse wall when said first and second tubular bodies are so relatively advanced,

said movable member including an elongated pin integral with said movable member projecting from said one end thereof beyond said portion of said movable member and engageable with said diaphragm for displacing said diaphragm away from said opening in said wall and allowing fluid flow through said opening means in said diaphragm and through said opening in said wall,

said movable member including a surface axially inwardly of the outer end of said pin,

said transverse wall being substantially flat and including a portion engageable by said surface of said movable member, whereby said movable member and said wall include interengageable surfaces for arresting the movement of said movable member when said first and second tubular bodies are so relatively advanced toward

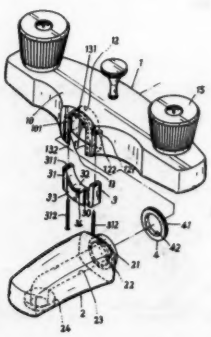
each other so that continued advancement of said tubular bodies causes said movable member to move away from said valve seat to allow fluid flow through said second tubular body to said outlet.

5,072,757

FAUCET HAVING ANGULARLY ROTATABLE SPOUT

Fu-Tung Lin, c/o Hung Hsing Patent Service Center, P.O. Box 55-1670, Taipei, Taiwan

Filed Apr. 23, 1991, Ser. No. 689,545
Int. Cl.[5] E03C *1/02*
U.S. Cl. 137—615 3 Claims



1. A faucet comprising:

a coupling portion having a main water passage formed therein, an archway extension formed on a central front portion of the coupling portion beyond the main water passage having an upper arcuate portion concave upwardly in the archway extension, a lower opened end portion formed in a lower portion of the archway extension, and an upper recess inwardly concave upwardly in the coupling portion adjacent to the archway extension;

a spout having a coupling disk formed as a shallow cylindrical shape annularly formed on an inner end portion of the spout rotatably secured in said coupling portion of said faucet, a journal portion formed between the spout and the coupling disk, a nozzle with an outlet water port formed on an outer end portion of the spout, and a central water passage formed in said coupling disk communicated with said main water passage and said outlet water port; and

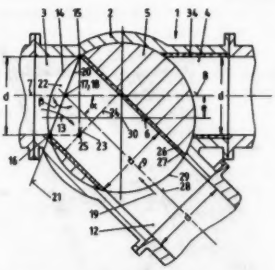
a detachable retainer detachably secured on the lower opened end portion of said coupling portion of said faucet rotatably engaging said coupling disk in cooperation with said coupling portion of said faucet, said detachable retainer including: a bottom block secured to a lower portion of the coupling portion of the faucet, a pair of side block portions formed on two opposite sides of the block respectively engageable with two side extensions which are recessed in two opposite side portions of the coupling portion disposed on two opposite sides of the upper recess, a lower recess concave downwardly in an inner portion of the bottom block combinable with the upper recess of the coupling portion of the faucet to define a circular disk hole for rotatably engaging the coupling disk of the spout, a lower arcuate extension formed on an outer portion of the bottom block defining a lower arcuate portion concave downwardly in the lower arcuate disk combinable with the upper arcuate portion of the archway extension to define a circular journal hole for rotatably engaging the journal portion of the spout.

5,072,758

ROTARY SLIDE VALVE

Wolfgang Krambrock, Vogt, Fed. Rep. of Germany, assignor to AVT Anlagen - und Verfahrenstechnik GmbH, Vogt, Fed. Rep. of Germany

Filed Jun. 4, 1990, Ser. No. 533,279
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1989, 3922240
Int. Cl.[5] F16K *5/04*
U.S. Cl. 137—625.47 8 Claims



1. A rotary slide valve comprising:

a stationary housing having first, second and third connection lines extending therefrom, the first and second lines extending from opposite sides of the housing along a common axis, the third connection line extending from the housing along a branched off axis at an angle from the common axis, each connection line having a circular cross-section; and

a cylindrical rotary plug rotatably mounted in the stationary housing, said rotary plug having a passage bore of circular cross section for the connection of the first and second connection lines and, on rotation of the plug, for the connection of the first connection line with the third connection line, the circular cross sections of the three connection lines and the cross section of the passage bore being approximately equal in all passage positions of the rotary slide valve,

wherein the passage bore of the rotary plug includes a first passage and a second passage which form an elbow, the first passage extends from one side of the rotary plug and corresponds to the circular cross section of the first connection line and the second passage extends from the other side of the rotary plug, said first passage meeting with said second passage at a planar elliptical surface within said cylindrical rotary plug.

5,072,759

REVERSE STRANDED CONDUIT

Bruce H. Moore, Kent, Ohio, assignor to Teleflex Incorporated, Limerick, Pa.

Filed Jan. 22, 1990, Ser. No. 468,082
Int. Cl.[5] F16L *11/12*
U.S. Cl. 138—153 4 Claims

1. A conduit (10) comprising:

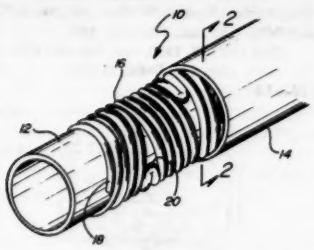
an inner tubular liner (12);

an intermediate layer (16) of at least one filament (18) extending longitudinally and helically about said inner liner (12);

an outer layer (14) disposed about said intermediate layer (16);

said assembly characterized by said filament (18) of said intermediate layer (16) extending alternately in a first

helical direction for more than one revolution about said inner tubular liner (12) and then in a second opposite



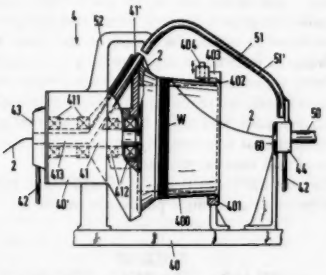
helical direction for more than one revolution about said inner tubular liner (12).

5,072,760

DEVICE FOR DRAWING A YARN INTO A WEFT ACCUMULATOR

Josef Kaufman, Elsau, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

PCT No. PCT/CH90/00036, § 371 Date Aug. 30, 1990, § 102(e) Date Aug. 30, 1990, PCT Pub. No. WO90/11396, PCT Pub. Date Oct. 4, 1990
PCT Filed Feb. 16, 1990, Ser. No. 566,424
Int. Cl.[5] D03D *47/34*
U.S. Cl. 139—452 7 Claims



1. A weft accumulator comprising

a rotatable hollow shaft having a winding tube extending angularly therefrom for passage of a weft yarn therethrough;

a storage drum for receiving and winding a weft yarn from said tube thereon;

a yarn eye spaced coaxially from said drum to receive a waft yarn therefrom;

a bent tube extending over said storage drum from said winding tube to adjacent said yarn eye for conveying a weft yarn therebetween, said bent tube having a longitudinally extending slot facing said storage drum to permit a yarn to pass therethrough from within said bent tube onto said drum.

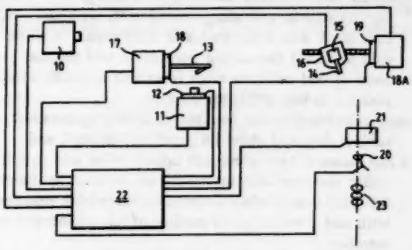
5,072,761

SKEINING DEVICE

Alexander J. Ciniglio, Brentwood, England, assignor to Pillarhouse International Limited, United Kingdom

Filed Oct. 10, 1990, Ser. No. 595,349
Claims priority, application United Kingdom, Oct. 11, 1989, 8922934
Int. Cl.[5] B65H *54/56*
U.S. Cl. 140—92.2 8 Claims

1. A skeining device for skeining wire, the device comprising front and rear retaining members, the front retaining member being adjacent an output end of the device, a shuttle member carrying a guide for guiding wire to be skeined, the shuttle member being movable to move the guide about a closed loop path to wrap the guided wire around the retaining members,



wherein drive means is provided for moving the shuttle member at different speeds during the movement of the guide about the closed loop path.

5,072,762

SEAL PUNCTURE FITTING ON A LIQUID CONTAINER

Jesus Jimenez, 15390 SW. 269th Ter., Homestead, Fla. 33032

Filed Jun. 21, 1990, Ser. No. 541,334
Int. Cl.[5] B65D *41/36*
U.S. Cl. 141—329 6 Claims

1. A combination liquid container and seal puncture assembly, the liquid container having a spout with a membrane seal disposed in covering, sealed relation over a top opening of the spout, said combination liquid container and seal puncture assembly comprising:

a cylindrical collar member adapted to fit telescopically about the spout of the container so at to be movable from a normally extended position to a collapsed position, said cylindrical collar member being disposed about the spout of the container with an upper portion of said cylindrical collar member extending beyond the top opening of the spout, defining said normally extended position,

a cutting means disposed within said upper portion of said cylindrical collar member and structured and configured to pierce and pry open the membrane seal covering the top opening of the spout upon telescopic movement of said cylindrical collar member to said collapsed position,

a cam means attaching said cylindrical collar member to the spout, said cam means dimensioned and disposed to allow for both rotational and vertical movement of said cylindrical collar member about the spout of the container,

said cam means including a notched cam track disposed circumferentially about the spout,

said cam means further including a cam disposed on an inner surface of said cylindrical collar member and adapted to

be receivingly engaged within said notched cam track on the spout so as to permit said rotational movement of said collar member about the spout,

said cam means further including a vertical groove interconnecting with an extending downwardly with said notched cam track and structured and configured to allow said cam to travel therealong permitting said vertical movement of said collar member from said normally extended position to said collapsed position,

said cylindrical collar member including a threaded outer surface disposed about an upper end thereof, and

a cap means for covering said upper end of said cylindrical collar member and including an annular lip having a threaded inner surface adapted for threadable engagement with said threaded outer surface of said cylindrical collar member.

5,072,763

STUD LINK FOR A TIRE CHAIN HAVING RECESSES ON SIDES OF THE LINK BODY

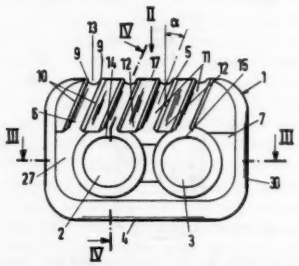
Anton Müller, and Günter Witzel, both of Aalen, Fed. Rep. of Germany, assignors to Eisen-und Drahtwerk Erlau Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 14, 1990, Ser. No. 494,177

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1989, 8903692[U]

Int. Cl.[5] B60C *27/20, 27/08*

U.S. Cl. 152—243 **17 Claims**



1. In a stud link for a tire protection and antiskid chain, including a link body having at least one attachment opening for chain links that are to be attached to said stud link, with said link body also having a wear portion that is provided with at least two recesses disposed next to one another on sides of said link body, with said recesses being spaced from one another in a longitudinal direction of said link body, wherein the improvement comprises:

at least a portion of said recesses having a groove configuration with raised portions therebetween, said recesses and said raised portions extending at an angle relative to a transverse central plane of said link body, with said raised portions having sharp-edged corners and edges;

said stud link having a tire contact surface and a wear surface, said recesses being disposed between said attachment openings and said wear surface;

said wear portion provided with several wear studs disposed one after the other in the longitudinal direction of said link body; and in which transverse grooves are formed between said wear studs, with said recesses extending approximately from said attachment openings to a bottom of said transverse grooves; and

said recesses opening into said transverse grooves.

5,072,764

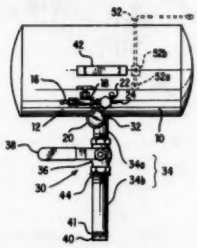
PNEUMATIC METHOD AND APPARATUS FOR SEATING TUBELESS TIRES

Sandy Ochoa, Ruidoso Downs, N. Mex., assignor to Tire Service Equipment Mfg. Co., Inc., Phoenix, Ariz.

Filed Oct. 20, 1990, Ser. No. 605,125

Int. Cl.[5] B60C *25/06*

U.S. Cl. 157—1.1 **19 Claims**



1. An apparatus for facilitating the seating of the bead of a tubeless tire on a rim comprising, in combination:

a) a tank for storing a charge of air at a predetermined elevated pressure, said tank having an inlet for connection to a source of compressed air, an outlet, and a volume dependent upon said elevated pressure and on the volume of said tire;

b) a substantially rigid discharge barrel mounted directly on said tank for conducting a flow of air from said tank through said outlet, said barrel and outlet together defining a discharge path through which said charge of air may be released to initiate the seating of said bead, said barrel defining an internal passage having a cross-sectional area of from approximately 8 to 20 square centimeters;

c) a valve connected in discharge control relationship to said discharge path, said valve having an internal port with a cross-sectional area roughly equal to the cross-sectional area of said internal passage;

d) whereby the rapid opening of said valve releases said charge of air as a single pneumatic pulse.

5,072,765

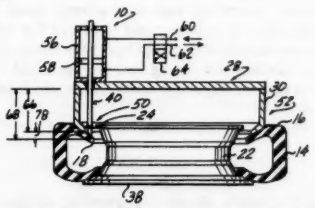
AUXILIARY TIRE BEAD DEPRESSOR

John P. Kane, and Francis H. Goodman, both of Sterling Heights, Mich., assignors to American Hofmann Corporation, Lynchburg, Va.

Filed Oct. 30, 1990, Ser. No. 605,547

Int. Cl.[5] B60G *25/06*

U.S. Cl. 157—1.1 **12 Claims**



1. An apparatus for inflating a tubeless tire, the tubeless tire having sidewalls and upper and lower annular tire beads, the tire being mounted on a wheel having upper and lower wheel flanges against which the upper and lower tire beads seal, respectively, the apparatus comprising:

an inflation bead having means for selectively supplying pressurized air to the tire;

an annular tire seal ring extending outwardly therefrom for depressing the sidewall; and

an auxiliary tire bead depressor, said auxilliary tire bead depressor comprising:

a) means, spaced from the annular tire seal ring, for selectively depressing the upper tire bead away from the upper wheel flange;

b) means for moving said upper tire bead depressing means from an advanced position wherein said depressing means engages and depresses the upper tire bead to a retracted position wherein said depressing means is spaced from the tire; and

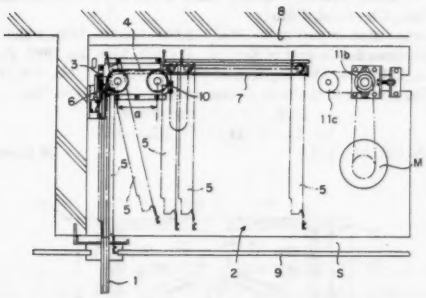
c) means for mounting said auxiliary tire bead depressor to said inflation head.

5,072,766

PANEL SHUTTER ASSEMBLY

Kohichi Kondoh, and Fumio Yagi, both of Tokyo, Japan, assignors to Bunka Shutter Co., Ltd., Tokyo, Japan

Filed Jan. 3, 1991, Ser. No. 637,037
Int. Cl.[5] E06B *3/92*
U.S. Cl. 160—36 **5 Claims**



1. In a panel shutter assembly comprising a plurality of shutter panels, a pair of transversely spaced apart upstanding guide rails defining a shutter opening therebetween, a panel storage box defining a panel storage space therein, the guide rails extending outwardly and downwardly of the box, a pair of chains to which the panels are fastened one after another, a set of sprockets provided in the box and engaging the chains, and a pair of panel supporting rails provided in the panel storage space for suspending the panels in a parallel and mutually adjoining relation to one another, the improvement wherein said sprockets consist of a pair of first sprockets provided above said guide rails for moving said panels vertically, and a pair of second sprockets horizontally spaced apart from said first sprockets and provided between said first sprockets and said space for moving said panels horizontally, each of said chains engaging one of said first sprockets and one of said second sprockets, and said panel supporting rails extend horizontally from the vicinity of said second sprockets, respectively.

5,072,767

DEVICE FOR FACILITATING THE FOLDING OF A RAISABLE CURTAIN

Bernard Kraeutler, Dunieres, France, assignor to Nergeco (SA), Dunieres, France

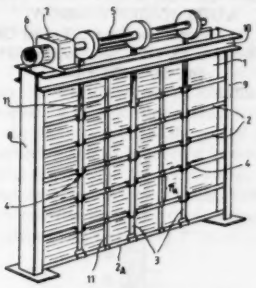
Filed Aug. 10, 1990, Ser. No. 565,623
Claims priority, application France, Aug. 11, 1989, 89-10803
Int. Cl.[5] A47H *5/00*
U.S. Cl. 160—84.1 **8 Claims**

1. A vertically raisable goods-handling door, which is foldable concertina-like, comprising:

a flexible curtain having horizontal bars disposed at regular intervals;

a plurality of lifting straps fixed to the bottom bar and passing through guide rings affixed to the other bars;

flexible and inextensible means, comprising flexible and inextensible elements generally in the form of a strip being disposed between each pair of adjacent bars and being in



a substantially flat condition when said curtain is hanging down, for limiting the spacing between said bars and for including folding in said curtain in a direction away from the lifting strap when said curtain is raised; and

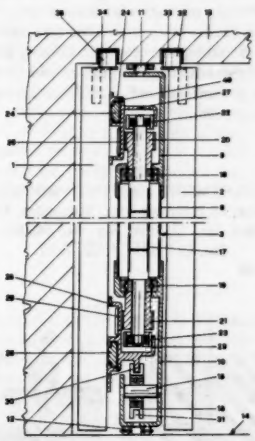
a drive unit including a strap winding shaft.

5,072,768

HINGE FOR FOLDING CLOSURE

Massimo Bonetti, Padua; Giuseppe Manente, Mestre, and Abramo Mion, Mirano-Zianigo, all of Italy, assignors to Kairos S.N.C. Di M. Bonetti, A. Manente, E. A. Mion Ing. & Arch., Venice, Italy

Continuation of Ser. No. 313,047, Feb. 21, 1989, abandoned. This application Jan. 29, 1991, Ser. No. 648,310
Claims priority, application Italy, Feb. 19, 1988, 84104 A/88
Int. Cl.[5] E05D *15/26*
U.S. Cl. 160—199 **24 Claims**



1. In a hinged leaf closure comprising at least one panel which undergoes mixed sliding and rotary movement, supported by an upright situated in proximity to a plane in which the panel lies when in its closed configuration, and having a pair of spaced, horizontal racks affixed to one surface of the panel, said racks being engaged with respective coaxial, interconnected gear wheels, the improvement comprising

means for directly connecting one of said panels to said upright, said connection means comprising a horizontal guided sliding member in contact with said upright

thereby enabling said panel to undergo horizontal guided sliding in contact with said upright substantially from one vertical edge of said panel to the other.

5,072,769

CUSHION DEVICE FOR A SUN VISOR USED ON AN AUTOMOBILE WINDOW

Hans Wu, No. 78, Chung-Shan Wu St., Tainan City, Taiwan

Filed Feb. 13, 1991, Ser. No. 654,823
Int. Cl.[5] B60J *3/00*
U.S. Cl. 160—370.2 **3 Claims**

1. A sun visor including a frame having a suction cup and a shaft with two free ends thereof, said frame being mounted on the glass of an automobile by said suction cup, said shaft being spaced apart from said glass and said shaft being swingable about said suction cup,

said sun visor further including a retractable sun shielding screen mounted on said shaft,

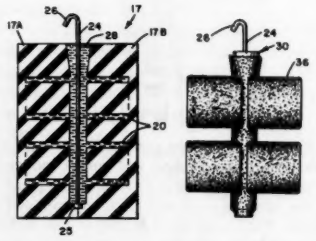
wherein the improvement is characterized in that said sun visor further has a cushion device including a holding portion and a resilient stand connected to said holding portion, said holding portion having a groove therein, a projection extending into said groove and two said cushion devices being respectively mounted on the free ends of said shaft in such a manner that the free ends of the same extended into said grooves of said holding portions while said resilient stands abut said glass of said automobile, said projection preventing said shaft from disengaging from said holding portion.

5,072,770

INVESTMENT CASTING PROCESS

Daniel B. Yodice, 31 Hillcrest Ave., Worcester, Mass. 01602

Filed Jun. 22, 1990, Ser. No. 543,038
Int. Cl.[5] B22C *9/02, 7/02*
U.S. Cl. 164—34 **11 Claims**



1. A method of making an investment casting comprising the following steps:

(a) forming a pattern which has the identical shape of the casting which is to be made,

(b) forming a mold of elastomeric material about said pattern,

(c) removing the pattern from said mold so that said mold has a cavity which has the identical shape of said pattern,

(d) filling said cavity with an aqueous material which is in its liquid state,

(e) cooling said mold until said aqueous material freezes to a solid state to form a temporary pattern which has the identical shape of the casting which is to be made,

(f) coating said temporary pattern with a ceramic material to form a self-supporting shell of ceramic material about said temporary pattern,

(g) heating the ceramic shell to melt said temporary pattern,

(h) evacuating the molten aqueous material from the shell so that a cavity is formed in said shell which has the identical shape of said casting,

(i) filling the cavity in said shell with molten metal,

(j) allowing said metal to solidify to form said casting, and

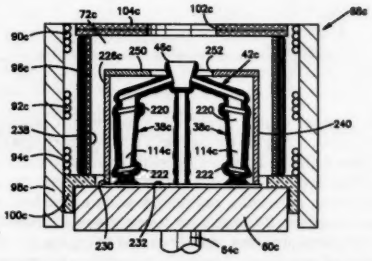
(k) removing the ceramic shell from said casting.

5,072,771

METHOD AND APPARATUS FOR CASTING A METAL ARTICLE

T. V. Rama Prasad, Mentor, Ohio, assignor to PCC Airfoils, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 312,044, Feb. 16, 1989, which is a continuation-in-part of Ser. No. 174,007, Mar. 28, 1988, Pat. No. 4,809,764. This application Feb. 9, 1990, Ser. No. 478,251
The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.
Int. Cl.[5] B22D *27/04;* B22C *9/20*
U.S. Cl. 164—122.1 **38 Claims**



1. An apparatus for use in casting a metal article having interconnected thick and thin portions, said apparatus comprising furnace means for transmitting heat to a mold structure in which the metal article is to be cast, movable chill plate means for receiving heat during casting and for supporting the mold structure in said furnace means while molten metal is conducted into the mold structure, means for moving said chill plate means and mold structure relative to said furnace means between a raised position in which the mold structure is disposed in said furnace means and a lowered position in which the mold structure is at least partially withdrawn from said furnace means, and wall means for promoting stress free solidification of the molten metal in the portion of the metal article where the thick and thin portions are interconnected, said wall means being movable with said chill plate means and being spaced apart from and extending around the outside of at least a portion of the mold structure with open space between said wall means and the mold structure to retard the transfer of heat from the portion of the mold structure where the molten metal is solidified to form the interconnection between the thick and thin portions of the metal article during movement of the mold structure from the raised position to the lowered position, said wall means having an inner side surface area from which heat is radiated to the mold structure through the open space between said wall means and the mold structure when the mold structure is in the raised position and to which heat is radiated

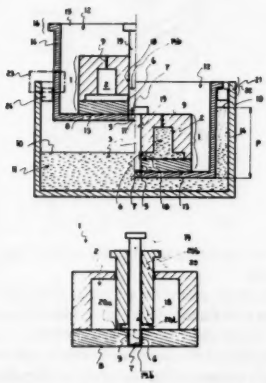
from the mold structure through the open space between said wall means and the mold structure during movement of said chill plate means and mold structure from the raised position to the lowered position.

5,072,772

METHOD FOR MOULDING OBJECTS AND INSTALLATIONS FOR CARRYING OUT THE PROCESS

Siegfried Haehne, Rue du Mauvais Pas, 80140 Saint Maulvis, France

Filed Aug. 25, 1989, Ser. No. 398,661
Claims priority, application France, Sep. 2, 1988, 88 11663
Int. Cl.[5] B22D *18/02, 41/14*
U.S. Cl. 164—133 **5 Claims**



1. Apparatus for molding objects comprising a source of liquid molding material, at least one mold cavity, at least one runner connecting the source to the mold cavity, a gate between the runner and the mold cavity, means for opening the gate to fill the mold cavity and closing the gate when the mold cavity is full of liquid material, and means for expressing the liquid material from the at least one runner when the gate is closed, further including an additional cavity communicating with the mold cavity, and means for expressing liquid material from the additional cavity into the mold cavity as solidification causes the material in the mold cavity to shrink, wherein the additional cavity has a volume substantially equal to volume of shrinkage of the solidifying liquid in the mold cavity, further including

at least one tank containing the source of molten material, said tank being open at its upper part,

means for maintaining the temperature of the source of the molten material and,

at least one device for moving one with respect to the other of the tank or mold cavity required to receive the mold so as to at least partially immerse the cavity of the mold under the level of the bath containing the material.

5,072,773

MOLD AND METHOD FOR MAKING VARIABLE HARDNESS CASTINGS

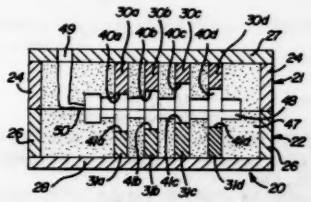
Gary F. Ruff, Farmington Hills; Karl D. Voss, Standish; Peter M. Naysmith, Jr., Allen Park, and James L. De Rupa, Trenton, all of Mich., assignors to CMI International, Inc., Southfield, Mich.

Filed Nov. 13, 1990, Ser. No. 612,257
Int. Cl.[5] B22D *15/00*
U.S. Cl. 164—127 **7 Claims**

1. A mold for sand casting a shaft having an elongated body with one or more integral, generally annular, radially outwardly extending lobes formed intermediate the ends of the shaft, comprising:

a flask formed of aligned cope and drag frames, which are each normally filled with sand and contain a portion of a casting cavity formed in the sand so that the casting cavities, when aligned, provide a complete enclosed casting cavity within the flask for the receipt of molten metal which solidifies within the cavity;

flat, narrow metal plates arranged transversely of the cope and drag frame, to form one or more pairs of cope and drag plates that are aligned with each other in coplanar relationship and in edge to edge contact with each other, and with the adjacent edges of the pair of aligned plates having curved, notch-like openings formed therein and aligned for defining the periphery of a lobe, said cope and drag frames each having a cover plate, formed of a heat conductive material, extending over its upper and lower surfaces respectively to thereby form a closed box-like



flask, and each of said plates having an edge engaging its respective, adjacent cover plate for conducting heat thereto so that heat may be transferred from the molten metal cast in the mold, through the edge portions defining the notches in the plates, through the plates, and then through the cover and base plates respectively, to atmosphere;

the aligned notch-like openings being shaped and sized to correspond to the complete, cast peripheral shape and size of a lobe, and the plates being of a thickness which is substantially equal to the thickness of the lobe;

whereby molten metal cast into the mold cavity formed in the shape of a shaft, will fill the cavity and simultaneously contact and be enclosed within the aligned notches for rapidly chilling and, thereby, hardening the peripheral surface of the lobe cast within the aligned notches, with the portion of the shaft formed in contact with the sand wall defining the cavity being softer than the surface of the lobe periphery.

5,072,774

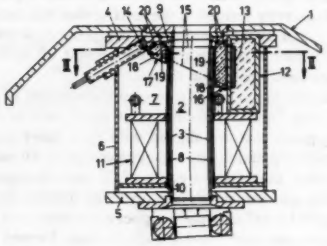
CONTINUOUS CASTING MOLD ARRANGEMENT

Klaus Schilcher, Linz, Austria, assignor to Voest-Alpine Industrieanlagenbau G.m.b.H., Linz, Austria

Filed Nov. 30, 1990, Ser. No. 621,030
Claims priority, application Austria, Dec. 4, 1989, 2758/89
Int. Cl.[5] B22D *11/18*
U.S. Cl. 164—150 **12 Claims**

1. In a continuous casting mold arrangement, such as a continuous steel casting mold arrangement, of the type including a continuous casting mold, mold side wall means defining a mold cavity, a cooling shell surrounding said mold side wall means and delimiting a coolant cavity together with said mold side wall means for a coolant to pass therethrough, and a level measuring means, said level measuring means being constituted by a radiation source disposed in the upper region of said continuous casting mold lateral of said mold cavity and adapted to emit beams following a beam path and by a beam

detector also arranged in the upper region of said continuous casting mold and lateral of said mold cavity, the improvement



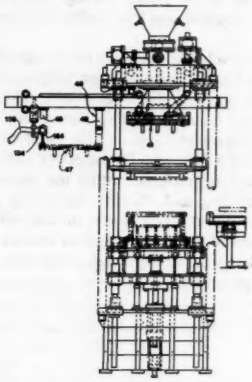
comprising at least one coolant displacer means provided in said coolant cavity in a region passed by said beam path.

5,072,775

CORE BLOWING MACHINE

Roger W. Hale, Hinckley, and Gerald B. Senk, Jr., Cleveland, both of Ohio, assignors to Equipment Merchants International, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 220,082, Jul. 18, 1988, Pat. No. 4,942,916. This application May 7, 1990, Ser. No. 519,949
Int. Cl.[5] B22C *9/12, 13/12, 15/22*
U.S. Cl. 164—186 **10 Claims**



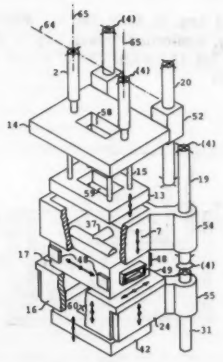
1. A foundry core blowing machine, comprising:
a vertically movable core box into which a sand resin is blown;
a horizontally shuttling carriage movable between a first position directly above said core box and a second position horizontally remote from such first position;
a gassing head adapted to be supported on said carriage; and
a horizontally extending nozzle mounted on said carriage for separable engagement with said gassing head;
whereby said nozzle and said gassing head are engaged when said gassing head is elevated by said core box slightly above the level of said carriage and said carriage is moved toward such first position, and said nozzle and said gassing head are separated when said gassing head is elevated by said core box slightly above said carriage in such first position and said carriage is moved toward such second position.

5,072,776

PRESS WITH SLIDINGLY SUPPORTED PRESS CHAMBER PARTS FOR PRESSING OF SECTIONS

Morten Munkeso, Glostrup, Denmark, assignor to Dansk Industri Syndikat A/S, Herlev, Denmark

Filed Jun. 29, 1990, Ser. No. 545,061
Claims priority, application Denmark, Jul. 6, 1989, 3359/89
Int. Cl.[5] B22C *11/10, 15/08*
U.S. Cl. 164—207 **8 Claims**



1. A press for pressing mold parts comprising:
a press stand;
at least one press chamber which is slidingly supported in said press stand and which has bordering walls which run parallel to a sliding direction of motion;
for each said press chamber, an associated press plate which is slidingly supported in the same sliding direction in said press stand, each said press plate having outside area dimensions which correspond in general to inside dimensions of the associated said press chamber in which said press plate is received such that said press plate is movable in the associated said press chamber in the sliding direction of motion;
means for placing a pattern at each said press chamber opposite the associated said press plate;
means for filling mold material into each said press chamber;
means for pressing the mold material filled into each said press chamber between the associated said press plate and pattern, said pressing means including a force generating means for exerting a pressing force between the associated said press plate and said press stand;
for each press chamber, discrete chamber guides attached thereto for slidingly supporting the associated said press chamber in the direction of motion;
for each press plate, discrete press plate guides attached thereto for slidingly supporting the associated said press plate in the direction of motion; and
wherein said chamber guides and said press plate guides are fastened independently of each other to said press stand.

5,072,777

PRESS FOR PRESSING OF MOLDS

Jens C. Grum-Schwensen, Frederikssund, Denmark, assignor to Dansk Industri Syndikat A/S, Herlev, Denmark

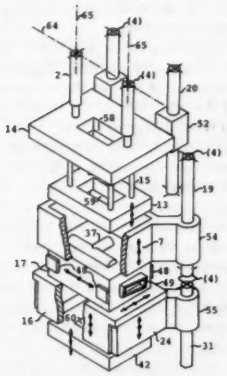
Filed Jun. 29, 1990, Ser. No. 545,074
Claims priority, application Denmark, Jul. 6, 1989, 3358/89
Int. Cl.[5] B22C *11/10, 15/08*
U.S. Cl. 164—207 **13 Claims**

1. A press for pressing mold parts comprising:
(a) a press stand (4),
(b) at least one press chamber (7,16,13,42) with an open side which is slidingly supported in the press stand (4),

(c) means for filling mold material into each said press chamber,

(d) means for pressing the mold material filled into each press chamber against a pattern,

(e) means for placing the pattern (37,-) opposite the open side of each press chamber, said placing means comprising i) a set of rails (21) fastened in the stand (4), ii) an associated trolley (8) movably supported on the rails, said trolley being adapted for releasable take-up of a pattern carrier (17) for the pattern (37,-) and iii) a motor means (22,23) for moving the trolley (8) on said rails between a working



position in which the pattern carrier (17) is held in a position where the pattern is held opposite to the open side of the associated press chamber (7,16,13,42) and a pattern changing position in which the pattern carrier (17) is replaceable in the trolley (8), and

(f) an ejector (10) for ejecting pressed mold parts or finished molds from said press chamber, the ejector (10) being fastened to an end of the trolley (8) that is furthest removed from the area where the pattern carrier (17) is placed when the trolley (8) is placed in the pattern changing position mentioned.

5,072,778

CASTING VESSEL FOR HOT-CHAMBER PRESSURE DIECASTING MACHINES

Roland Fink, Winterbach, Fed. Rep. of Germany, assignor to Oskar Frech GmbH & Co., Fed. Rep. of Germany

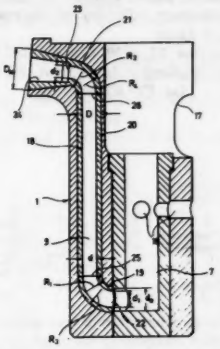
Filed May 22, 1990, Ser. No. 526,588

Claims priority, application Fed. Rep. of Germany, May 30, 1989, 3917487

Int. Cl.[5] B22D *17/04*

U.S. Cl. 164—316 **21 Claims**

1. A casting vessel for hot-chamber pressure diecasting machines which is cast in one piece from heat-resistant tool steel, comprises a casting chamber with running surfaces for a casting plunger, an ascending bore arranged approximately in parallel to the casting chamber so as to lead into the casting chamber at one end and have a mouthpiece at the opposite end for connecting a nozzle, wherein the ascending bore is a cast-in pipe bent in the area of a mouth leading to the casting chamber



and in the area of the mouthpiece and welded together from at least two components.

5,072,779

CONTINUOUS CASTING MACHINE OF A REDUCED HEIGHT WITH IMMERSED TEEMING NOZZLE

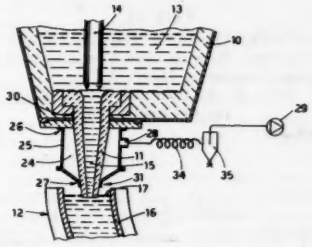
Riccardo Tosini, Udine, and Alfredo Bassarutti, Terenzano-Pozzuolo del Friuli, both of Italy, assignors to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Aug. 31, 1988, Ser. No. 238,301

Claims priority, application Italy, Sep. 7, 1987, 83452 A/87; Nov. 5, 1987, 83488 A/87; Jul. 29, 1988, 83463 A/88

Int. Cl.[5] B22D *11/00*

U.S. Cl. 164—415 **8 Claims**



1. A continuous casting machine of reduced height, comprising:

a tundish;

an oscillatory crystallizer;

a teeming nozzle which delivers molten metal from the tundish to the crystallizer, said teeming nozzle having a tube portion through which molten metal flows, an end of said teeming nozzle being located below a meniscus of molten metal formed within the crystallizer;

means for regulating the flow of molten metal through said teeming nozzle;

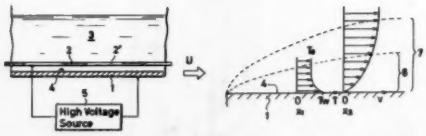
means for maintaining, at least transiently, a predetermined pressure within the tube portion of the teeming nozzle which will hinder the migration of gas from outside the teeming nozzle to the tube portion of the teeming nozzle, said predetermined pressure being related to pressure surrounding the teeming nozzle and to pressure acting on the meniscus of the molten metal; and

at least one chamber located circumferentially around an outer surface of the teeming nozzle, and means for obtaining a controlled negative pressure within the chamber.

5,072,780
METHOD AND APPARATUS FOR AUGMENTATION OF CONVECTION HEAT TRANSFER IN LIQUID

Akira Yabe, Tsukuba, Japan, assignor to Agency of Industrial Science & Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Nov. 17, 1989, Ser. No. 437,665
Claims priority, application Japan, Nov. 18, 1988, 63-291791
Int. Cl.[5] F28F *13/16*
U.S. Cl. 165—1 **6 Claims**



4. A method for augmentation of convection heat transfer in a liquid, the method comprising the steps of:

supplying a liquid having an electrical conductivity of not less that $10^{-10}(1/\Omega\cdot m)$ to a heat transfer surface of an electrically conductive material with a flow velocity driven by an external source of fluid pressure difference, the liquid having sufficient flow velocity for forming a thermal boundary layer in a vicinity of the heat transfer surface and a viscous boundary layer, and a Reynolds number of the flow velocity being within a laminar flow range;

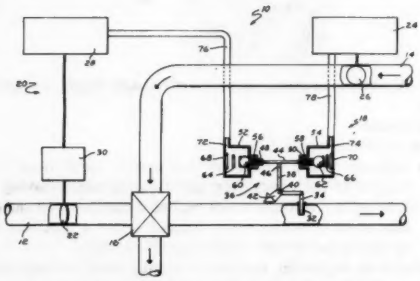
disposing an electrode, with low flow resistance, at a position substantially at a boundary between the thermal and viscous boundary layers; and

applying a direct current to the electrode to produce turbulence in the thermal boundary layer to augment heat transfer between the liquid and the heat transfer surface and minimize loss of fluid energy.

5,072,781
TEMPERATURE CONTROL SYSTEM

Robert B. Goodman, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 30, 1990, Ser. No. 559,027
Int. Cl.[5] B60H *1/02*
U.S. Cl. 165—40 **15 Claims**



1. A temperature control system for providing a supply fluid within a desired temperature range, which comprises:

a. a supply duct that houses and directs the flow of the supply fluid;

b. a cooling duct that houses and directs the flow of a cooling fluid;

c. a precooler affixed to the fluid duct and cooling duct so that the supply fluid passes through the precooler in a heat-transfer relationship with the cooling fluid;

d. a pressure regulating valve in fluid communication with the supply duct upstream of the precooler that controls the pressure and flow rate of the supply fluid within the supply duct;

e. a modulator in fluid communication with the cooling duct upstream of the precooler that controls the flow rate of cooling fluid within the cooling duct;

f. a temperature sensor for measuring and controlling the temperature of the supply fluid in the supply duct downstream from the precooler that comprises:

i. a temperature sensing element affixed to the supply duct downstream from the precooler that moves an affixed stem in response to changes in the temperature of the supply fluid;

ii. an actuator assembly having one end pivotally affixed to the stem of the temperature sensing element and a "T"-shaped crossbar end;

iii. a pair of poppet valves adjacent the "T"-shaped crossbar end of the actuator assembly aligned so that one side of the crossbar end adjustably contacts a first poppet valve and the other side of the crossbar end adjustably contacts a second poppet valve;

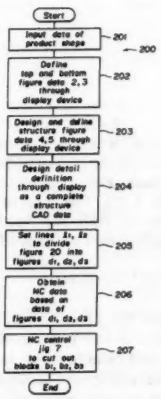
iv. a first servo duct in fluid communication with the first poppet valve and the pressure regulating valve so that a change in temperature of the supply fluid moves the stem of the temperature sensor that moves the actuator assembly which adjusts the first poppet valve thereby communicating through the first servo duct to the pressure regulating valve to change the pressure and flow of the supply fluid upstream of the precooler; and

v. a second servo duct in fluid communication with a second poppet valve and the modulator so that a change in temperature of the supply fluid moves the stem of the temperature sensor that moves the actuator assembly which adjusts the second poppet valve thereby communicating through the second servo duct to the modulator to change the flow of the cooling fluid upstream of the precooler.

5,072,782
METHOD OF PRODUCING PATTERN FOR MOLDING CASTINGS

Takaoki Namba, and Teruo Kamada, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,392
Claims priority, application Japan, Jul. 8, 1988, 63-170094; Jul. 8, 1988, 63-170095
Int. Cl.[5] B22C *7/00*
U.S. Cl. 164—45 **4 Claims**


Start
Input data of product shape
201
200
Define top and bottom figure data 2, 3 through display device
202
Design and define structure figure data 4, 5 through display device
203
Design detail definition through display as a complete structure CAD data
204
Set lines l_1, l_2 to divide figure 20 into figures d_1, d_2, d_3
205
Obtain NC data based on data of figures d_1, d_2, d_3
206
NC control jig 7 to cut out blocks b_1, b_2, b_3
207
End

1. A method of producing a pattern for casting a die having

a shaping panel and an attachment panel, said method comprising the steps of:

drawing a first rib figure including a plurality of first ribs extending from the shaping panel of the die based on configuration figure data which are entered manually or through data transfer to a computer-aided design system based on the configuration of a product to be shaped by said shaping panel;

drawing a second rib figure including a plurality of second ribs extending from the attachment panel of the die based on the structure of a press machine which incorporates the die;

drawing an intermediate section which joins said first and second rib figures to each other thereby drawing and entire die figure;

dividing said entire die figure into a plurality of block figures and generating machining data for the respective block figures;

said entire die figure being divided into said block figures by at least one parting line extending in such a direction that each of said blocks can be fully machined from a foam blank by a machining tool;

producing a plurality of blocks from the foam blank based on said machining data; and

joining said blocks into a pattern corresponding to said entire die figure.

5,072,783

EXTRACTION SYSTEM OF GEOTHERMAL ENERGY

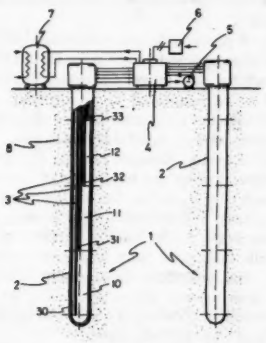
Guillermo Ayala Martinez, and Juan A. de Ferrer Daroca, both of Balluarte, s/n - portal 1 piso 9 J, Algeciras (Cádiz), Spain

Filed Oct. 31, 1990, Ser. No. 607,156

Claims priority, application Spain, Nov. 13, 1989, 8903852

Int. Cl.[5] F24J *3/08*

U.S. Cl. 165—45 **6 Claims**



1. An apparatus for extracting heat from a geothermal deposit using fluid circulation comprising:

a closed sounding pipe for containing a fluid and extending from the surface of the geothermal deposit into the geothermal deposit;

a plurality of fluid conducting pipes of different lengths extending within said sounding pipe, each pair of pipes of adjacent lengths defining a unique thermal exchange zone within said sounding pipe; and

fluid distributor means external to said sounding pipe for causing fluid to flow through two of said fluid conducting pipes defining a working one of said thermal exchange zones whereby thermal transfer from the surrounding geothermal deposit to said fluid occurs in the working one of said thermal exchange zones while the other of said thermal exchange zones can regenerate their storage of heat from the surrounding geothermal deposit.

5,072,784

HEAT EXCHANGER ARRANGEMENT FOR COOLING A MACHINE

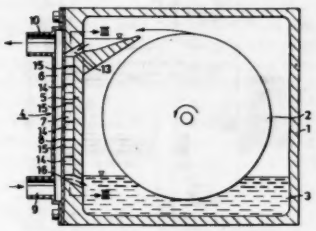
Stig Stenlund, Bataljvägen, Sweden, assignor to Stenhex Aktiebolag, Saltsjöbaden, Sweden

Continuation of Ser. No. 224,948, Jul. 28, 1988, abandoned, which is a continuation-in-part of Ser. No. 847,659, Feb. 25, 1986, Pat. No. 4,923,003. This application Mar. 29, 1990, Ser. No. 501,320

Claims priority, application Sweden, Feb. 24, 1987, 8700774–6; Feb. 18, 1988, PCT/SE88/00071

Int. Cl.[5] F28D *9/00;* **F01D** *11/08*

U.S. Cl. 165—47 **9 Claims**



1. An arrangement for cooling a machine which comprises a housing (1) in which movable, mechanical elements (2), which are driven when the machine is working, are housed, and which encloses a liquid medium (3), characterized in that the arrangement includes a heat exchanger (4) which is arranged in a part of one external wall (5) of the housing (1) and which includes two chambers (6, 7) which are mutually separated by a liquid-impervious partition wall (8) which constitutes a part of the liquid-impervious wall of the housing (1); in that the chamber (6) located outwardly of the partition wall (8) is adapted to be through-passed by a cooling medium, whereas the chamber (7) located inwardly of the partition wall (8) is adapted to be through-passed by the liquid medium (3) enclosed in the housing (1); in that the inwardly located chamber (7) incorporates a large number of flow channels (12) which are connected in parallel with regard to the flow of the liquid medium therethrough; in that the flow channels (12) have a narrow rectangular cross-sectional shape dimensioned for laminar flow of the liquid medium therethrough and are defined by fins (11) formed integrally with the partition wall (8); in that the one respective ends of the flow channels communicate with an inlet (13) to the chamber (7) via distribution channels (14), whereas the other respective ends of the flow channels communicate with an outlet (16) from the chamber (7) via collecting channels (15); and in that the heat exchanger (4) is so positioned in the housing (1) that the inlet (13) and the outlet (16) for the chamber (7) located inwardly of the partition wall (8) have a mutual position such that when the machine is working, the liquid medium (3) will flow through the chamber (7), from the chamber inlet (13) to the chamber outlet (16), under the influence of the movement of the mechanical elements (2) housed in said housing.

5,072,785

CONVECTIVELY COOLED BOLT ASSEMBLY

Jeffrey T. Dressler, Jupiter; Deane A. Beytes, Tequesta, and Gunther Eichhorn, Palm Beach Gardens, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 12, 1990, Ser. No. 536,907

Int. Cl.[5] F02C *7/12;* **F16B** *35/00*

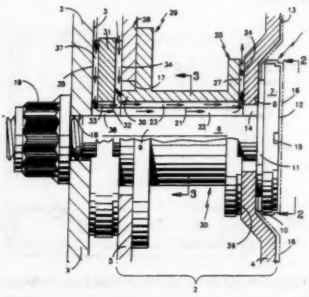
U.S. Cl. 165—47 **7 Claims**

1. A convectively cooled bolt assembly for use in a high temperature environment, said assembly comprising:

a first spacer including first and second opposed ends with a first spacer bore extending therebetween, a plurality of radial cooling channels in said first end which communicate with said first spacer bore and extend radially out-

ward therefrom, a first cooling flange adjacent said first end of said first spacer, and a second cooling flange offset from said second end of said first spacer;

a second spacer having two opposed faces with a second spacer bore extending therebetween, at least one of said two opposed faces includes a plurality of cooling channels which communicate with said second spacer bore, said first spacer bore communicates with said second spacer bore to provide for coolant flow from said plurality of cooling channels of said second spacer to said plurality of radial cooling channels of said first spacer;



a bolt having a head and a shaft attached thereto, said shaft extending through said first spacer bore and having a diameter which is significantly less than the first and second spacer bore diameters to permit coolant to flow therethrough; and,

a nut threaded onto said shaft, said nut secures said second spacer to said first spacer;

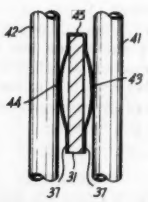
wherein said first spacer has a stem which protrudes from said second flange and contacts said second spacer, said first spacer bore extends through said stem and said stem supports said second spacer in spaced relation to said second flange.

5,072,786

ANTI-VIBRATION SUPPORT OF U-BEND FLOW TUBES IN A NUCLEAR STEAM GENERATOR

Willliam J. Wachter, Wexford, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jul. 27, 1990, Ser. No. 558,591
Int. Cl.[5] F28F *7/00*; F28D *7/16*
U.S. Cl. 165—69 **12 Claims**



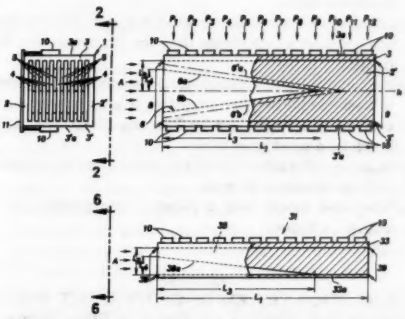
1. In a heat exchanger having a plurality of spaced-apart tubes and further having at least one support bar disposed intermediately of the respective tubes, the improvement in reducing vibration of the tubes against the support bar, comprising a plurality of hairpin springs carried by the support bar, the hairpin springs being substantially parallel to each other and spaced-apart from each other, each of the hairpin springs including a bight portion and further including a pair of legs, each of the legs having an end portion secured to the support bar, and further having a bowed portion intermediately of the end portion and the bight portion, respectively, and each bowed portion resiliently engaging a respective tube, thereby substantially eliminating the vibration of the tubes in the heat exchanger.

5,072,787

FINNED HEAT SINK

Niro Nakamichi, Tokyo, Japan, assignor to Nakamichi Corporation, Tokyo, Japan

Filed Aug. 27, 1990, Ser. No. 573,674
Claims priority, application Japan, Aug. 30, 1989, 101387[U]
Int. Cl.[5] F28F *13/00*
U.S. Cl. 165—80.3 **13 Claims**



1. A radiator for cooling a plurality of power transistors using a flow of cooling air comprising:

first through fourth side walls including exterior and interior surfaces, said side walls also having longitudinal edges joined so that said interior surfaces form a hollow portion of quadrilateral cross section which extends between opposed inlet and outlet end openings for the passage of cooling air;

a plurality of power transistors disposed adjacent exterior surfaces of an opposed pair of sidewalls for transfer of heat to the radiator, said power transistors including terminals adapted to be connected to an electrical circuit board disposed adjacent an exterior surface of a side wall extending between said opposed side walls; and

a plurality of spaced elongate cooling fins disposed within said hollow portion and having length and width dimensions, each of said cooling fins having its length extending longitudinally within said hollow portion and its width extending between the interior surfaces of said opposed side walls associated with said power transistors, said cooling fins providing substantially V-shaped notches which open toward said inlet opening with each leg of said substantially V-shaped notches being associated with one of said opposed side walls.

5,072,788

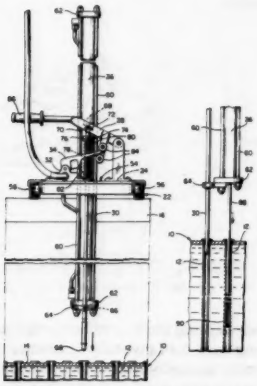
CATALYTIC CONVERTER TUBE LOCATOR AND CLEANER

Duane N. Goodwin, 3 S. Frontage Rd., Goldhill, Oreg. 97525, and Craig D. Goodwin, 110 Savage Circle Rd., Grants Pass, Oreg. 97527

Filed Jan. 30, 1991, Ser. No. 648,139
Int. Cl.[5] F28G *1/02*
U.S. Cl. 165—95 **12 Claims**

11. In combination, a support, an elongated and longitudinally projectable and retractable pilot means mounted from said support, an elongated and longitudinally projectable and retractable tool mounted from said support and substantially paralleling said pilot means, power means operative to power project and power retract said tool relative to said support, manual means operative to manually project and retract said

pilot means relative to said support, and control means for said power means operatively associated with said manual means for actuating said power means to project said tool means responsive to projection of said pilot means from a retracted



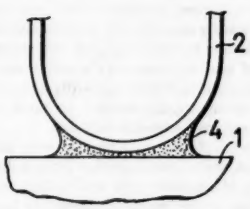
position past a first projected position thereof to a second further projected position thereof and for actuating said power means to retract said tool means responsive to partial retraction of said pilot means from said second projected position to said first projected position.

5,072,789

HEAT EXCHANGER MADE OF ALUMINUM

Tadashi Usui, and Shinji Kagoshige, both of Tochigi, Japan, assignors to Showa Aluminum Corporation, Sakai, Japan

Filed Dec. 6, 1990, Ser. No. 623,625
Claims priority, application Japan, Dec. 8, 1989, 1-319123
Int. Cl.[5] F28F *19/00*
U.S. Cl. 165—134.1 **9 Claims**



1. A heat exchanger made of aluminum comprising a tube and a fin joined thereto by a fillet substantially made of zinc, each of the tube and the fin being prepared from a material made of aluminum and being nobler than the fillets by at least 0.325 V in terms of potential.

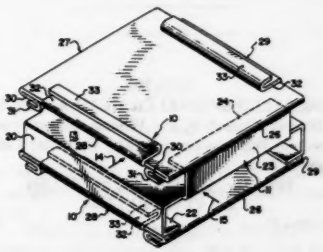
5,072,790

HEAT EXCHANGER CORE CONSTRUCTION

Andrew Lapowsky, Winnipeg, Canada, assignor to Jones Environics Ltd., Winnipeg, Canada

Filed Jul. 30, 1990, Ser. No. 560,051
Int. Cl.[5] F28F *3/08;* **B21D** *53/04*
U.S. Cl. 165—166 **13 Claims**

1. A heat exchanger core for forming a first fluid path and a second fluid path which is fluid imperviously separated from the first fluid path and in heat exchanging relation therewith, said core comprising a plurality of first plate members and a plurality of second plate members, each of said first and second plate members being formed from a substantially rigid sheet metal material of constant thickness and shaped to define a planar plate with the first and second plate members being assembled alternately so that the plates lie in parallel stacked spaced relationship, the space between the plate of each first plate member and the plate of a next adjacent second plate member on one side defining a part of the first fluid path and the space between the plate of each first plate member and the plate of the next adjacent second plate member on an opposed side defining a part of the second fluid path, and a plurality of first and second connecting means, each first connecting means coupling one of said first plate members to the next adjacent second plate member on a respective side of said one of said first plate members and defining between said one of said first plate members and said next adjacent second plate members a first and a second guiding wall each bridging the space between said one of the first plate members and said next adjacent second plate member at a respective one of two parallel edges of said one of the first plate members and said next adjacent second plate member and forming side edges of said part of the first fluid path, each second connecting means defining between one of said first plate members and the other of said next adjacent second plate members a third and a fourth guiding wall each bridging the space between said one of said first plate



members and said other of said next adjacent second plate members at a respective one of two parallel edges of said one of the first plate members which parallel edges are at right angles to the parallel edges of the first and second guiding walls, said third and fourth guiding walls forming side edges of said part of the second fluid path, each of said first, second, third and fourth guiding walls comprising an edge portion of one of said first and second plate members which is bent at an angle to the planar plate to which it is attached, and each of said connecting means including a pair of slot means each slot means of said pair being defined by one of said first and second plate members and being arranged along a respective edge of the other of said first and second plate members, each slot means comprising two slot sides and a slot base interconnecting the slot sides, said slot sides both lying parallel to the planar plate of that one of said first and second plate members by which the slot means is defined, the slot base being dimensioned so as to form between said slot sides a distance substantially equal to said thickness of the sheet metal material, and said slot sides receiving therebetween an edge portion of said respective edge of the other of said first and second plate members.

5,072,791

METHOD OF STABILIZING FORMATION PRIOR TO GRAVEL PACKING

Lee E. Whitebay, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Oct. 3, 1990, Ser. No. 592,417
Int. Cl.[5] E21B *43/04*
U.S. Cl. 166—278 **8 Claims**

8. In a method of gravel packing a well in a potentially hydrocarbon-producing subterranean formation penetrated by a wellbore wherein perforations created by a perforating step extend from said wellbore into said formation and wherein gravel is packed into said well in the zone adjacent said forma-

tion and outside a production tubing section extending therethrough and said gravel is also packed into said perforations, the improvement comprising:

(a) prior to producing hydrocarbons from said formation, forcing a fluid substantially free of divalent ions into the perforation zone of said formation to flush divalent ions therefrom; and

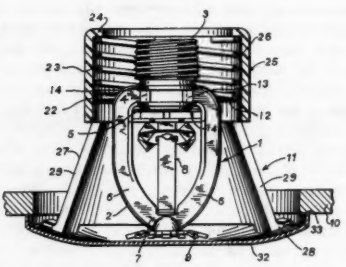
(b) after step (a) and prior to producing hydrocarbons from said formation, contacting the surfaces of said perforations with a stabilizing fluid containing (1) one or more water-soluble high molecular weight polyfunction polymers capable of forming several nucleophilic sites when treated with base and (2) one or more potassium salts whose anions are Bronsted-Lowry bases of sufficient strength to raise the pH of the stabilizing fluid to above 9.0 but which are relatively weak nucleophiles compared to the nucleophilic sites of the polymers, said polymers and said salts being present in an amount sufficient to stabilize the surfaces of said perforations until said perforations are packed with gravel.

5,072,792

CONCEALED SPRINKLER HEAD ASSEMBLY

John R. Simons, Greendale, and William Galaszewski, Brookfield, both of Wis., assignors to Star Sprinkler Corporation, Milwaukee, Wis.

Filed Apr. 13, 1989, Ser. No. 337,469
Int. Cl.[5] A62C *37/08*
U.S. Cl. 169—37 **13 Claims**



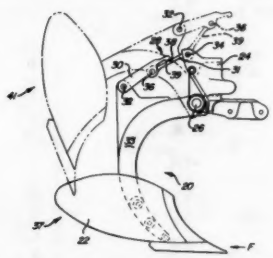
1. In a concealed sprinkler head assembly, a frame having an outlet to be connected to a water line, valve cap means to enclose said outlet, releaseable means interconnecting the frame and said valve cap means for releasing said valve cap means when said releaseable means is exposed to a predetermined elevated temperature, the improvement comprising, a pre-assembled cover plate unit attached to said frame, said unit including connecting means to engage said frame as said unit is moved upwardly relative to said frame, a generally tubular sleeve connected to said connecting means and disposed radially outward of said connecting means, a cover plate, fusible means interconnecting the lower end of the sleeve and the cover plate, biasing means interposed between said connecting means and said sleeve, first means interconnecting the sleeve and said connecting means for maintaining the biasing means in a compressed condition as said unit is assembled with said frame, said first means being operable as a consequence of relative rotation between the sleeve and said connecting means for releasing the biasing means from said compressed condition to urge said sleeve and said cover plate upwardly relative to said connecting means to bring said cover plate into engagement with the lower surface of a ceiling of a building.

5,072,793

TRIP ASSEMBLY

William L. Grimm, Wheaton, and Charles E. Sheets, Naperville, both of Ill., assignors to Case Corporation, Racine, Wis.

Filed Aug. 2, 1990, Ser. No. 561,837
Int. Cl.[5] A01B *61/04*
U.S. Cl. 172—266 **11 Claims**



1. A ground-working implement comprising:

a ground-engaging tool pivotally connected to a frame;

a trip assembly normally maintaining said ground-engaging tool at a plowing position and comprising a relatively rigid toggle member and a relatively resilient spring toggle member, said rigid toggle member being pinned to said ground-engaging tool at a first point, said spring toggle member being pinned to said frame at a second point, said rigid toggle member having a fulcrum member in contact with said spring toggle member at a contact position vertically above said spring toggle member, said rigid toggle member being pinned to said spring toggle member at a third point, said third point being an undercenter dimension vertically below a line drawn between said first and second points, a force applied to said ground-engaging tool being transmitted to flex said spring toggle member vertically upwardly into said fulcrum member at said contact position, and in turn forcing said third point vertically upwardly, said trip assembly tripping and causing said ground-engaging tool to be moved vertically upwardly to a tripped position when said third point has moved upwardly through said undercenter dimension and crosses said line between said first and second points, the tripping of said trip assembly causing said rigid toggle member to pivot vertically upwardly about said first point and said spring toggle member to pivot vertically upwardly about said second point; and

a second line is defined extending between said second and third points, said contact position being a distance defined as a spring offset above said second line, the ratio of said spring offset to the length of the spring toggle measured along said second line between the second and third points is equal to, or less than 0.06.

5,072,794

ALCOHOL-IN-OIL DRILLING FLUID SYSTEM

Arthur H. Hale, and George C. Blytas, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

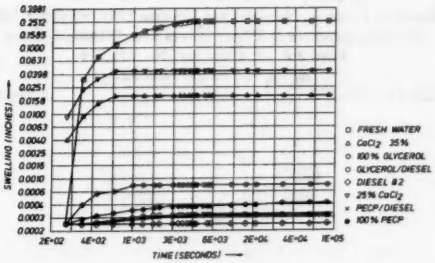
Continuation-in-part of Ser. No. 503,497, Mar. 30, 1990, abandoned, which is a continuation-in-part of Ser. No. 252,206, Sep. 30, 1988, abandoned. This application Mar. 19, 1991, Ser. No. 671,622
Int. Cl.[5] E21B *21/00, 49/00*; C09K *7/02, 7/06*
U.S. Cl. 175—50 **15 Claims**

2. A method for drilling a well, comprising:

rotating a drill string to cut a borehole into the earth;

circulating invert oil emulsion drilling fluid, said drilling fluid comprising oil, emulsifier and alcohol, through the drill string and through the annulus between the drill string and the wall of the borehole, the alcohol being at least about 30% by weight of the internal phase of the

emulsion and being selected from the group consisting of (1) an alcohol having less than 8 hydroxyl groups and less than 16 carbon atoms; (2) an acyclic polyol having 3 to 80 carbon atoms and 2 to 60 hydroxyl groups; (3) a monoalicyclipolyol having 5 to 30 carbon atoms and 2 to



10 hydroxyl groups; (4) a cyclicetherpolyol having 6 to 1800 carbon atoms, 2 to 450 hydroxyl groups, and 2 to 600 ether linkages; and (5) mixtures thereof;

monitoring the influx of formation water into the drilling fluid; and

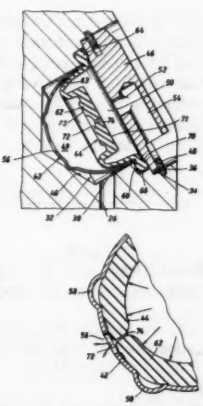
identifying cations and anions specific to the water influx.

5,072,795

PRESSURE COMPENSATOR FOR DRILL BIT LUBRICATION SYSTEM

Steve R. Delgado, Houston; Robert J. Kotch, Kingwood, and Frank Hall, Houston, all of Tex., assignors to Camco International Inc.

Filed Jan. 22, 1991, Ser. No. 643,486
Int. Cl.[5] E21B *10/22*
U.S. Cl. 175—228 **11 Claims**



1. In a roller cutter drill bit having a body, a leg extending downwardly from said body with a cylindrical bearing journal on an end thereof, and a roller cutter mounted for rotation on said journal; a lubrication system for providing lubricant to said bearing journal comprising:

a generally cylindrical lubricant reservoir in said leg defining an inner bottom and an open outer end;

a lubricant passage from said reservoir to said bearing journal;

a diaphragm mounted across said reservoir separating said reservoir into a drilling fluid chamber on one side of the diaphragm and a lubricant chamber on the opposite side of said diaphragm;

said diaphragm having an outer periphery, a rolling loop of a relatively small thickness adjacent said outer periphery, and a center portion of a relatively large thickness substantially greater than the thickness of said rolling loop;

said large thickness center portion having a self sealing normally closed puncture, said normally closed puncture opening and relieving a predetermined excess pressure in said lubricant chamber on one side of said diaphragm for leakage of lubricant into said fluid chamber, and opening and relieving a predetermined excess pressure in said drilling fluid chamber on the other side of said diaphragm for leakage of drilling fluid into said lubricant chamber;

a generally bowl shaped rigid cup supported on the bottom of said reservoir and having an aperture at its center; and

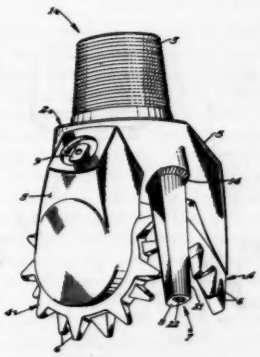
means on said cup for contacting said reservoir bottom to support said cup thereon and defining fluid passageways between said bottom and said cup to permit fluid flow therethrough.

5,072,796

BORING BIT

Zhonghou Shen; Yiji Xu, and DeXin Wang, all of Shandong, China, assignors to University of Petroleum, China, Shandong, China

Filed May 18, 1990, Ser. No. 525,922
Claims priority, application China, May 19, 1989, 89207234.2
Int. Cl.[5] E21B *10/18, 10/60*
U.S. Cl. 175—340 **11 Claims**



1. A boring bit for drilling, comprising one set of rotatable toothed wheels secured thereon as well as one set of tubular nozzles for injecting drilling fluid from a chamber in the bit body toward the bottom of a borehole, the boring bit comprising:

an inlet end of each tubular nozzle being secured on the bit body and connected to said chamber and an outlet end of each tubular nozzle positioned during operation approximate the toothed wheels and the bottom of the borehole; and

an inner hole of each tubular nozzle for passage of drilling fluid from the inlet end to the outlet end, the inner hole being straight and cylindrical from the inlet end to the outlet end, the inner hole being straight and cylindrical both prior to and during the drilling operations.

5,072,797

CHECKWEIGHING METHOD AND APPARATUS

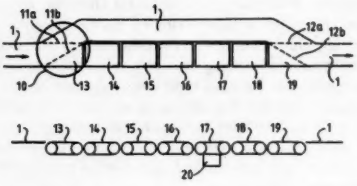
Melville G. Hughes, 22 High Street, Ashley, Newmarket, Suffolk, CB8 9DX, England

Filed Jun. 20, 1990, Ser. No. 541,059

Claims priority, application United Kingdom, Jun. 24, 1989, 8914557

Int. Cl.[5] G01G *19/00, 19/52;* B65G *47/64*

U.S. Cl. 177—145 23 Claims



1. A method of assessing the weight of items passing along a conveyor line, which comprises directing the items to pass from the conveyor line onto a conveyor means positioned beside the line so that the items by-pass a length of the conveyor line before rejoining the latter, and weighing the items on a weight assessment device included in the conveyor means, wherein the conveyor means comprises an infeed section for acceleration and separation of the items; a weight assessment device across which the items can be conveyed; and an outfeed section for realignment of the items prior to their return to the conveyor line.

5,072,798

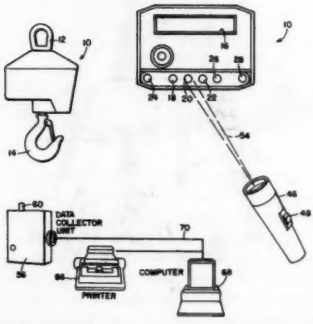
CRANE SCALE LOAD RECORDING DEVICE

Samuel H. Franklin, Box 470181, Tulsa, Okla. 74147

Filed Sep. 25, 1990, Ser. No. 587,727

Int. Cl.[5] G01G *19/14, 23/18*

U.S. Cl. 177—147 9 Claims



1. A scale comprising:

a weight determining element having means to support the element and means for engaging and suspending a load whereby the weight of a load is measured;

information storage means within said weight determining element;

means externally of said weight determining element for initiating the transfer of a measured weight to said information storage means;

a data storage means external of and separate from said weight determining element;

means of temporarily interconnecting said weight determining means and said data storage means; and

means of initiating the transfer of data from said information storage means within said weight determining element to said data storage means when such element and means are interconnected.

5,072,799

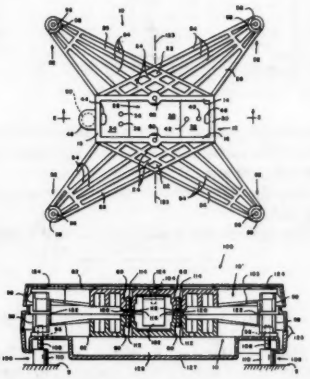
LOAD CELL SUPPORTING MEMBER AND WEIGHING SCALE INCORPORATING THE SAME

Gerald C. Freeman, Norwalk, and Norman Lilly, Stratford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Jul. 11, 1990, Ser. No. 551,374

Int. Cl.[5] G01G *23/02, 21/28*

U.S. Cl. 177—154 6 Claims



1. A weighing scale, comprising:

(a) a load cell supporting member;

(b) a load cell supported by said load cell supporting member; and

(c) a platform supporting member supported by said load cell;

said load cell supporting member and said platform supporting member being substantially identical; each of said supporting members comprising (i) a central portion having means for protecting said load cell from excessive loading, and (ii) a plurality of arms extending radially from said central portion; each of said protecting means comprising a walled perimeter, said perimeter having means for mounting a downstop element.

5,072,800

SUPPORT BEAM FOR A VEHICLE

Robert J. Price, Dunlap, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Continuation of Ser. No. 513,695, Apr. 24, 1990, abandoned. This application Dec. 11, 1990, Ser. No. 625,797

Int. Cl.[5] B62D *55/084*

U.S. Cl. 180—9.48 9 Claims

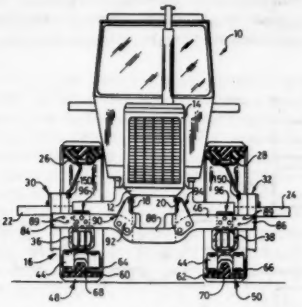
1. A support beam for connecting and supporting a vehicle on first and second auxiliary frame assemblies, said vehicle having a main frame, comprising:

an elongated beam having first and second end portions, a middle portion and first and second transition portions connecting respectively said first and second end portions to said middle portion, said beam having a substantially rectangular configuration in cross-section;

means for releasably connecting each of said auxiliary frames to a respective end portion of the support beam; and

first and second hanger assemblies connected to said main

frame of said vehicle and connected respectively to said first and second transition portions of said support beam,



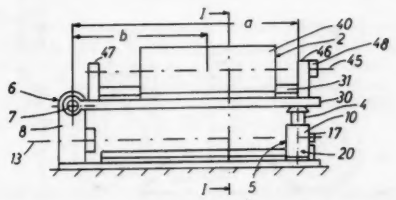
said hanger assemblies being adapted to support said vehicle on said support beam during operation of said vehicle.

5,072,801

VIBRATION ABSORBER

Raymond Freymann, Eching; Albrecht Keck, Oberschleissheim, and Anton Haas, Garmisch-Partenkirchen, all of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 454,929
Int. Cl.[5] B60R *18/02*
U.S. Cl. 180—68.5 15 Claims



1. A damping arrangement having an adjustable natural frequency, for absorbing vibrations in a vehicle having a vehicle body and a vehicle battery, comprising:

an absorber mass comprising at least said vehicle battery, and having a center of mass;

support means for supporting said absorber mass on the vehicle body, said support means being pivotably coupled to said vehicle body by a pivotable coupling at a first end thereof, and being supported on said vehicle body at a second end opposite said first end by at least one bearing comprising an absorber spring and an absorber damper, said absorber spring and absorber damper being connected in parallel;

means for modifying the natural frequency of said damping arrangement by varying at ieast a distance between said pivotable coupling and the center of mass of said absorber mass; and

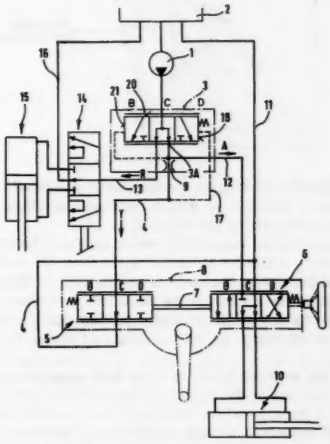
a control circuit for automatically controlling said means for modifying the natural frequency of the damping arrangement, in response to vibrations of the vehicle body.

5,072,802

CONTROL MECHANISM FOR TWO HYDRAULIC ADJUSTMENT DEVICES SUPPLIED VIA ONE, EACH, CURRENT BRANCH BY A HIGH-PRESSURE PUMP

Werner Tischer, Heubach-Lautern, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG, Friedrichshafen, Fed. Rep. of Germany

PCT No. PCT/EP88/01064, § 371 Date Apr. 18, 1990, § 102(e) Date Apr. 18, 1990, PCT Pub. No. WO89/05256, PCT Pub. Date Jun. 15, 1989
PCT Filed Nov. 24, 1988, Ser. No. 469,576
Claims priority, application Fed. Rep. of Germany, Dec. 1, 1987, 3740661
Int. Cl.[5] B62D *5/06*
U.S. Cl. 180—132 3 Claims



1. In a control mechanism for two hydraulic adjustment devices including a pump (1) for supplying pressurized hydraulic fluid, a divider valve (3) connected with said pump, said divider valve having first and second flow lines, a first hydraulic adjustment device (10) connected with said first flow line (12), said first adjustment device comprising a steering mechanism for a motor vehicle, steering valve means (6) connected with said first flow line between said divider valve and said first adjustment device for controlling, the delivery of hydraulic fluid to said first adjustment device, a second hydraulic adjustment device (15) connected with said second flow line (13), an activation valve (14) connected with said second flow line between said divider valve and said second adjustment device, and a pilot flow line (4) connected between said first flow lines and a non-return return line (11) aid pilot flow line containing a measurement diaphragm (9) for restricting the flow of pressurized fluid in said pilot flow line, the improvement which comprises

(a) said steering mechanism comprising a hydraulic steering unit having a mechanical connection between a manual steering wheel and a manual force device connected to means for manual steering of the wheels of a motor vehicle;

(b) A pilot valve (5) connected with said pilot line; and

(c) a connecting member (7) for connecting said pilot valve with said steering valve means for shifting movement therewith in response to operation of the steering wheel, whereby when said steering valve means is in a neutral position, said pilot valve connects said first flow line with said non-return line, and when said steering valve means is shifted to a working position, said pilot valve is shifted to block said pilot line.

5,072,803
METHOD OF SETTING AN ASSISTING FORCE IN POWER-ASSISTED STEERING

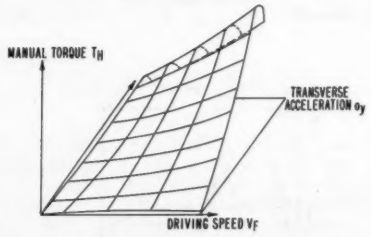
Ulrich Kilian, D-Albershausen; Jürgen Götz, Lorch; Claus-Michael Hainbuch, Weinstadt, and Berthold Edenhofer, Ebersbach/Fils, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jul. 9, 1990, Ser. No. 550,090

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1989, 3922527

Int. Cl.[5] B62D *5/06*

U.S. Cl. 180—141 **36 Claims**



1. A method for setting an assisting force in a power-assisted steering as a function of actual measured drivingcondition parameters, comprising the steps of

deriving a desired value for a manual torque to be applied to a steering wheel by a vehicle driver from the actual measured driving-condition parameters, one of the driving-condition parameters being an actual measured value of transverse acceleration, and a further driving-condition parameter being an actual measured value of vehicle speed,

setting the assisting force on an at least approximately continuous basis in the power-assisted steering such that the manual torque and the assisting force, on the basis of the actual measured driving condition parameters, are precisely compensated with steering forces to control the desired value;

a least approximately continuously reducing the assisting force in the power-assisted steering as a result of both increasing actual measured values of the transverse acceleration and increasing actual measured values of the vehicle speed; and

effecting a greater reduction, at desired transverse acceleration, in the assisting force as the vehicle speed increases, than at another lower transverse acceleration.

5,072,804
POWER-ASSISTED STEERING SYSTEM

Hubert Bischof, Vaihingen/Enz; Ulrich-Eugen Konigorski, Möglingen, and Uwe Kirberg, Markgröningen-Unterriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 4, 1990, Ser. No. 577,276

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1989, 3929176

Int. Cl.[5] B62D *5/04*

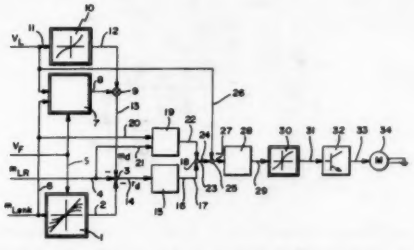
U.S. Cl. 180—142 **15 Claims**

1. A power-assisted steering system for a motor vehicle such as an automobile and truck for travel over a roadway, the vehicle including a wheel carrier assembly having wheels rotatably journalled thereon and a steering wheel assembly having a steering wheel on which forces act and to which a driver of the vehicle applies a steering wheel torque (m_{LR}) when manipulating the steering wheel assembly for steering the vehicle, the wheels being subjected to mechanical reaction from the roadway travelled on by the vehicle, the power-assisted steering system comprising:

a servo drive operatively connected to said wheel carrier assembly for articulating said wheels whereby an actuating torque (m_{Lenk}) is developed between said servo drive and said wheel carrier assembly;

steering wheel torque supply means for supplying a first signal indicative of the steering wheel torque (m_{LR});

actuating torque (m_{Lenk}) supply means for supplying a second signal indicative of said actuating torque (m_{Lenk}); and,



controller means receiving said first and second signals to form a control difference (r_d) and for controlling said forces acting on said steering wheel to predetermined values while considering the mechanical reaction from the roadway.

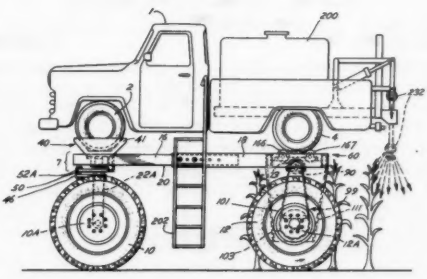
5,072,805
HIGH CLEARANCE VEHICLE FRAME CONSTRUCTION

Elmo R. Meiners, Box 126, Anchor, Ill. 61720

Filed May 24, 1990, Ser. No. 528,562

Int. Cl.[5] B60P *3/06, 3/07, 3/30*

U.S. Cl. 180—198 **6 Claims**



1. A high clearance frame construction for supporting a vehicle in an elevated position, said vehicle of the type having front steering wheels and rear driving wheels with a drive train to said rear driving wheels from the engine of the vehicle, said construction in an elevated position comprising, in combination:

a) at least one longitudinal frame member;

b) at least two generally parallel spaced transverse frame members attached to the longitudinal frame member, said longitudinal frame member including means for adjusting the spacing of the transverse members from one another;

c) running gear attached to each end of the transverse frame members, said running gear including a vertical support bracket depending from the transverse frame member and wheel means attached to each vertical support racket whereby the transverse frame members and longitudinal frame member are elevated for support of a vehicle in an elevated position on the assembled frame members;

one of said transverse members defining a forward transverse member, said forward transverse member includ-

ing a means for engaging the front steering wheels of a vehicle supported on the frame construction and also including steering gear means connecting the means for engaging with the wheel means of the forward transverse member whereby the wheel means of the forward transverse member may be steered in response to steering movement of the front steering wheels of the vehicle;

another of said transverse members defining a rear transverse member, said rear transverse member including means for driving the rear wheel means and for cooperation with driving means of a vehicle on the frame construction; and

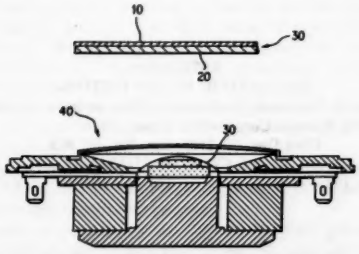
the forward transverse member and the rear transverse member each comprising two telescoping sections slideably disposed with respect to each other to permit adjustment of the overall width of the frame construction, said frame construction also comprising a means for securing said telescoping sections in a fixed position for operation.

5,072,806

DIAPHRAGM FOR ACOUSTIC EQUIPMENT

Hideo Odajima, Fujioka, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 276,015
Int. Cl.[5] G10K *13/00*; H04R *7/00*
U.S. Cl. 181—170 **5 Claims**



1. A multilayer diaphragm for acoustic equipment comprising only two layers, a completely carbonaceous base layer and a SiC film surface layer on at least one surface of said base layer, said diaphragm having a sound velocity about 10% greater and a Young's modulus about 40% greater than said base layer without the SiC film surface layer.

5,072,807

MOVING STAIRCASE ESCAPE-WAY FROM OFFSHORE PLATFORMS

Tokume Fujita, Rio de Janeiro, Brazil, assignor to Petroleo Brasileiro S.A.-Petrobras, Rio De Janeiro, Brazil

Filed Jun. 6, 1990, Ser. No. 534,057
Claims priority, application Brazil, Jun. 20, 1989, 8902977
Int. Cl.[5] E06C *9/14*
U.S. Cl. 182—42 **4 Claims**

1. A moving staircase escape-way for an offshore platform, said escape-way enabling said offshore platform to be evacuated; said moving staircase escape-way comprising:

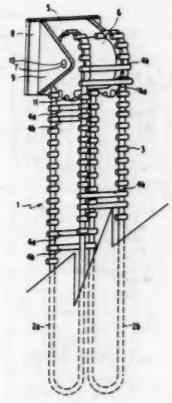
a) a cylindrical drum having shafts protruding therefrom at opposite ends for rotatably mounting said cylindrical drum to said offshore platform;

b) a pair of spaced apart pulleys disposed at opposite ends of said cylindrical drum, each of said pulleys having semicircular slots which are equally spaced apart around the circumference of each of said pulleys;

c) a first pair of endless wire ropes disposed parallel to one another and which pass through a plurality of rolls spaced apart from one another at equal intervals;

d) a second pair of endless wire ropes disposed parallel to one another and to said first pair of wire ropes and which pass through a plurality of rolls spaced apart from one another at equal intervals;

e) wherein selected pairs of rolls of said first pair of wire ropes are joined to corresponding pairs of parallel rolls of said second pair of wire ropes by pairs of non-skid rungs, said pairs of non-skid rungs being spaced at equal intervals along said staircase; and



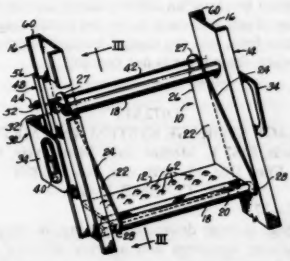
f) wherein said plurality of rolls of said first pair of wire ropes fit into said slots of a corresponding one of said pulleys, and said plurality of rolls of said second pair of wire ropes fit into said slots of the other of said pulleys as said staircase moves so as to lower a user from said offshore platform.

5,072,808

LADDER ADAPTABLE PLATFORM

Gregory P. Spalt, and Taylor E. Spalt, both of 8 Redgate La., Cohasset, Mass. 02025

Filed Dec. 28, 1990, Ser. No. 636,071
Int. Cl.[5] E04C *1/38*, *7/16*
U.S. Cl. 182—103 **15 Claims**



1. A ladder adaptable platform for use on an extension ladder, the extension ladder having a pair of parallel side rails and spaced rungs, to provide a stepping surface in alignment with a rung of the extension ladder, said ladder adaptable platform comprising:

a platform surface arrangeable adjacent to the backside of a rung, and releaseable securable thereto;

an arrangement of side frame members secured to said platform surface; and

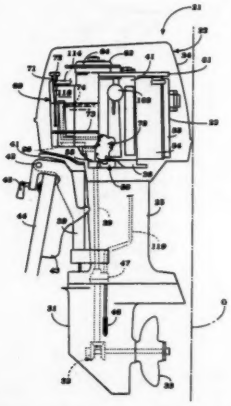
articulable engagement means attached to the side frame members, to engage the rails of an extension ladder, and which are moveable with respect thereto.

5,072,809

LUBRICATING DEVICE FOR FOUR STROKE OUTBOARD MOTOR

Yasuhiko Shibata, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 20, 1990, Ser. No. 512,782
Claims priority, application Japan, Apr. 20, 1989, 1-98797
Int. Cl.[5] F01M *11/06*
U.S. Cl. 184—6.13 **21 Claims**



1. An outboard motor comprised of a power head having a powering internal combustion engine have an internal lubrication system, a propulsion unit driven by said engine for propelling an associated watercraft, means for mounting said outboard motor upon a hull of the associated watercraft for movement between a plurality of trim adjusted positions and a tilted up out of the water position, a dry sump lubricant reservoir for containing lubricant for lubricating said engine, a scavenge pump driven by said engine and having an inlet port communicating with the engine internal lubricating system for receiving lubricant therefrom and an outlet port for returning lubricant to said dry sump lubricant reservoir, and a pressure pump having an inlet port for drawing lubricant from said dry sump lubricant reservoir and an outlet port for delivering lubricant under pressure to the engine internal lubricating system, at least one port of each of said pumps being positioned above the normal lubricant level within said dry sump lubricant reservoir in all positions of said outboard motor for precluding the draining of lubricant from said dry sump lubricant reservoir back to the engine when the engine is not running.

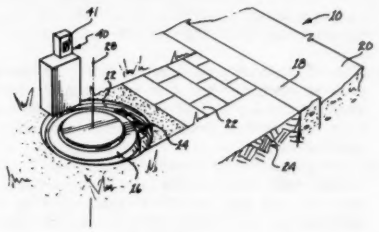
5,072,810

GARBAGE STORAGE SYSTEM AND METHOD

Erwin C. Theis, 8152 E. Medina Ave., Mesa, Ariz. 85208

Filed Dec. 11, 1990, Ser. No. 625,811
Int. Cl.[5] B66B *11/04*
U.S. Cl. 187—27 **1 Claim**

1. A garbage storage device comprising, in combination, a wheeled garbage container and a drive elevator to lift the wheeled garbage container; the drive elevator has upright guides which are fixedly connected to a cylindrical, open ended, steel wall; the steel wall is positioned in an underground pit adjacent to a curb of a street; the drive elevator has a platform coupled to the upright guides by an upright plate; the upright guides are positioned substantially within the underground pit except for an uppermost end which support a single cable drive; the single cable drive is positioned above the underground pit and is provided with an electrical or manual drive means to actuate the single cable drive; the single cable drive lifts and lowers the platform; garbage is stored within the wheeled garbage container while the wheeled garbage container is supported by the platform in its lowered position within the underground pit to avoid the problem of oders adjacent a house; the drive means would be actuated to list the platform to a level such that the wheeled garbage container



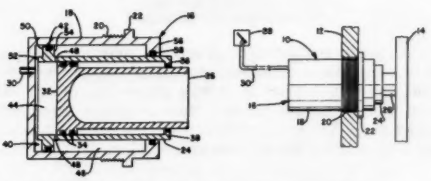
would be moved in a direction off and away from the platform and closer to the curb of the street; this avoids the problem of strenuous work of moving a full, wheeled, garbage container to the curb of the street long distances from the house.

5,072,811

TELESCOPIC BRAKE PISTON

Kenneth D. Everhard, Wadsworth, Ohio, assignor to Aircraft Braking Systems Corporation, Akron, Ohio

Filed Dec. 27, 1989, Ser. No. 457,903
Int. Cl.[5] F16D *55/18*
U.S. Cl. 188—72.4 **6 Claims**



1. A telescopic brake piston assembly, comprising:

a cylindrical housing;

a first piston having an annular head and a cylindrical body extending therefrom said annular head being slidingly received within said housing, defining a first cavity between said housing and said cylindrical body;

a second piston slidingly received within said first piston and in contacting engagement with a pressure plate of a brake disc stack;

a second cavity within said housing and bounded by said first and second piston;

a passageway through said cylindrical body of said first piston selectively interconnecting and disconnecting said first and second cavities as a function of a position of said second piston with said first piston, providing an only restriction to movement of said first piston within said housing between first and second ends of said housing; and

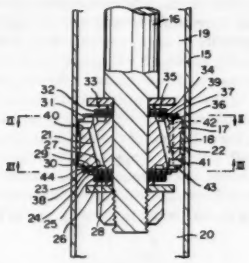
a hydraulic conduit passing through said housing to said first cavity, providing an only conduit for hydraulic fluid between the telescopic brake piston and a source of hydraulic pressure.

5,072,812

HYDRAULIC SHOCK ABSORBER

Tomio Imaizumi, Kanagawa, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Dec. 29, 1989, Ser. No. 458,541
Claims priority, application Japan, Jan. 10, 1989, 1-1351[U]
Int. Cl.[5] F10F 9/348
U.S. Cl. 188—282 5 Claims



1. A hydraulic shock absorber comprising:

a cylinder;

a piston axially slidably fitted in the cylinder so as to divide the interior of the cylinder into a first cylinder chamber and a second cylinder chamber; and

a damping force generating mechanism mounted on said piston for generating damping force by controlling the flow of the working fluid between said two cylinder chambers, said damping force generating mechanism comprising:

at least one first passage formed through said piston oblique to the axis of said piston and connecting said first and second cylinder chambers,

a first recess formed in one end of said piston on the side of an outlet end of said first passage so as to include said outlet end of said first passage,

at least one second passage formed through said piston parallel to said axis of said piston, at a circumferential position differing from that of said first passage, and connecting said first and second cylinder chambers,

a second recess formed radially outside said first recess in said one end of said piston on the side of an outlet end of said second passage so as to include said outlet end of said second passage;

a partition wall separating said first recess and said second recess from each other, and a cutout formed in a top surface of said partition wall and connecting said first and second recesses with each other, said outlet end of said first passage opening into said first recess at a position circumferentially corresponding to said connecting cutout; and

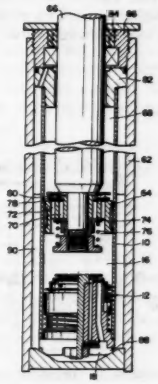
a disk valve assembly disposed on said one end of said piston on said side of said outlet end of said first passage, said assembly comprising a plurality of disk valve elements having different diameters and superposed in decreasing order of diameter on said piston so as to define a first chamber together with said first recess and to define a second chamber together with said second recess, and means for fixing inner peripheries of said disk valve elements to said one end of said piston so that said inner peripheries are incapable of flexing and such that, when pressure is received through said first and second passages through inlet ends thereof to said outlet ends thereof, outer peripheries of said disk valve elements sequentially flex away from said one end of said piston in said decreasing order of diameter as said pressure increases, thereby providing a sequentially increasing damping force.

5,072,813

DAMPER

Yuji Yoshioka; Yukio Yamamoto, both of Susono; Osamu Ogawa, Mishima; Fujio Nakayama; Tomoki Hitani, both of Susono, and Ryuichi Kurosawa, Numazu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Feb. 15, 1990, Ser. No. 480,619
Claims priority, application Japan, Feb. 16, 1989, 1-34887
Int. Cl.[5] F16F 09/34
U.S. Cl. 188—322.15 7 Claims



1. A damper comprising:

a cylinder;

a partition member for partitioning the interior of the cylinder into a first liquid chamber and a second liquid chamber, and including:

means for generating a damping force by the flow of liquid from said first liquid chamber to said second liquid chamber; and

a bypass path for communicating between said first and second liquid chambers without passing through said damping force generating means;

a mass body attached to said partition member for moving relative to said partition member in an axial direction of said cylinder and for opening and closing said bypass path; and

means for making the speed of said mass body when opening said bypass path faster than the speed of said mass body when closing said bypass path in response to a relative displacement between said mass body and said partition member, a relative speed difference between said mass body when opening said bypass path and said mass body when closing said bypass path being generated by a difference in flow resistance imparted against the motion of said mass body as said mass body moves to open and to close said bypass path.

5,072,814

HYDRAULICALLY OPERABLE TRANSMISSION

Masaaki Hama, and Junichirou Inoue, both of Osaka, Japan, assignors to Kubota Corporation, Osaka, Japan

Filed Sep. 10, 1990, Ser. No. 579,522
Claims priority, application Japan, Jan. 9, 1990, 2-2358
Int. Cl.[5] B60K 41/22; F16D 25/14
U.S. Cl. 192—3.57 5 Claims

1. A hydraulically operable transmission comprising change speed gear means,

hydraulic change speed control means for operating said change speed gear means, including a plurality of hydraulic actuators interlocked with said change speed gear means, and a pilot type control valve for supplying and discharging pressure oil to/from said hydraulic actuators,

thereby changing the transmission from a low speed condition to a high speed condition,

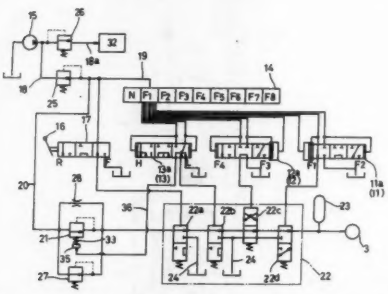
a hydraulic clutch engageable and disengageable with a change speed operation of said change speed gear means caused by said control valve,

an oil line for supplying pressure oil to said hydraulic clutch, and

pressure increase adjusting means connected to said oil line for adjusting pressure increase characteristics when said hydraulic clutch is engaged, said pressure increase adjusting means including

a normally open first switch valve (**21**) closable when a secondary hydraulic pressure exceeds a first set level,

a normally closed second switch valve (**27**) openable when



the secondary hydraulic pressure exceeds a second set level higher than said first set level,

a restrictor (**28**),

a spring (**33**) for urging said first switch valve toward an open position, and

urging force varying means for varying an urging force of said spring, said urging force varying means being operable by a pilot pressure via a pilot oil line (**36**) provided between said first switch valve (**21**) and a hydraulic change speed control means to increase the urging force of said spring when said hydraulic change speed control means is operated to a high speed position,

said first and second switch valves and said restrictor being provided on said oil line (**20**) and connected parallel to one another.

5,072,815

POWER LINE TO DRIVE A VEHICLE

Roger P. Jarvis, Leamington, United Kingdom, assignor to Automotive Products plc, England

PCT No. PCT/GB89/00089, § 371 Date Oct. 25, 1990, § 102(e) Date Oct. 25, 1990, PCT Pub. No. WO89/10282, PCT Pub. Date Nov. 2, 1989

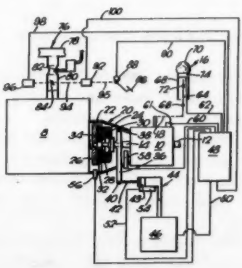
PCT Filed Jan. 31, 1989, Ser. No. 601,681

Claims priority, application United Kingdom, Apr. 30, 1988, 8810365

Int. Cl.[5] B60K *41/08*

U.S. Cl. 192—0.08 **11 Claims**

1. A power line, to drive at least one ground running wheel (**4**) of a motor vehicle (**2**), said power line comprising an internal combustion engine (**8**) giving a rotary motion output, fuel supply means (**76**; **80A**, **84**, **140**; **150**, **152**) to supply fuel to said engine, said fuel supply means comprising controllable throttle means (**80**, **84**; **80A**, **84**, **140**; **150**, **152**) openable and closeable to vary the amount that the throttle means is open to increase and decrease supply of fuel to the engine, a change-speed gearbox (**10**) having a rotary output shaft (**12**) for supplying rotary motion to said ground running wheel and a rotary input shaft (**14**) for receiving output torque from the engine and a plurality of gear ratios between said shafts, each gear ratio being engageable and disengageable in response to operation of gear ratio selector means (**16**) in response to manual action of a driver of the vehicle, a clutch (**20**) interposed between said engine and said input shaft for transmitting engine output torque to the input shaft, clutch control means (**46**, **48**) operable to vary the torque transmitting capacity of said clutch over a range from a pre-determined maximum capacity (Cl) to substantially zero capacity, the clutch control means being responsive to occurrence of a first signal (**62**) indicative of a wish by the driver to disengage the currently engaged said gear ratio and being responsive to occurrence of a second signal (**60**) indicative that another said gear ratio has been engaged, said clutch control means responding to said first signal to cause the clutch automatically to disengage substantially fully and responding to said second signal to cause the clutch automatically to engage substantially fully, and throttle control means (**86**, **88**, **48**, **92**, **94**) to open and close said throttle means in response to driver initiated throttle demand signals, characterised in that the throttle control means (**48**, **86**, **88**, **92**, **94**, **96**) is automatically operable on occurrence of said first signal (**62**) to vary the amount which said throttle means (**80**, **84**; **80A**, **84**, **140**; **150**, **152**) is open and is automatically operable on the subsequent occurrence of the second signal (**60**) to restore the throttle means substantially to an open amount (Td) corresponding to that being demanded by the driver's current



throttle demand signal (**90**), upon the occurrence (t1) of said first signal the throttle control means is automatically operated to at least reduce the amount that the throttle means is open to a value (%T . . . Tc . . . 0) lower than that (Td) currently demanded by the driver, and upon occurrence (t4) of said second signal signifying to said clutch control means (**46**, **48**) engagement of a higher gear ratio than the previously engaged ratio the clutch (**20**) is automatically engaged such that the torque transmitting capacity (C) of the clutch (**20**) is increased from substantially clutch fully disengaged up to a target torque transmitting capacity (Ct) which is less than said pre-determined maximum (Cl) and in the course of said increase up to the target torque transmitting capacity (Ct) the torque transmitting capacity (C) of the clutch (**20**) is increased at a first rate (**118**) and after attaining said target torque transmitting capacity (Ct) the torque transmitting capacity (C) of the clutch (**20**) is automatically increased at a lower second rate (**124**) towards said pre-determined maximum (Cl), and wherein in the course of increasing the torque transmitting capacity at said first rate (**118**) the engaging clutch (**20**) causes the engine (**8**) to so slow that engine deceleration (**120**) is greater than any (**114**) immediately before occurrence (t4) of the second signal.

5,072,816

AIR FEEDER FOR A PULL TYPE CLUTCH ASSEMBLY

Hiroshi Takeuchi, and Kimio Mizuguchi, both of Neyagawa, Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

PCT No. PCT/JP89/00714, § 371 Date Apr. 6, 1990, § 102(e) Date Apr. 6, 1990, PCT Pub. No. WO90/01643, PCT Pub. Date Feb. 22, 1990

PCT Filed Jul. 14, 1989, Ser. No. 477,863

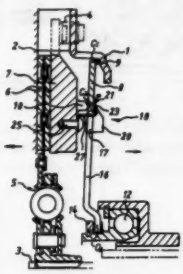
Claims priority, application Japan, Aug. 9, 1988, 63-105718

Int. Cl.[5] F16D *13/72*

U.S. Cl. 192—70.12 **1 Claim**

1. A pull type clutch assembly comprising a flywheel, a

pressure plate, a clutch disc intermediate said flywheel and said pressure plate, a clutch cover fixed to said pressure plate by elastic straps, and a release bearing, a diaphragm spring having circumferentially extending openings at an outer end portion of radial slits passing through said diaphragm spring, said diaphragm spring having a front surface facing said pressure plate and a rear surface facing away from said pressure plate, an outside fulcrum at a radial end portion of said rear surface of said diaphragm spring in engagement with said clutch cover, an intermediate fulcrum on said front surface of said diaphragm spring engaging a fulcrum land on said pressure plate and an inside fulcrum at a radial inner end portion of said



rear surface of said diaphragm spring in engagement with said release bearing, and an air feeder disposed on said rear surface of said diaphragm spring and mounted on mounting pedestals passing through spaced of said circumferential openings and affixed at inner ends to said pressure plate and air scoops intermediate said pedestals and projecting rearwardly of said rear surface of said diaphragm spring for directing air through said circumferentially extending openings, said air feeder having means engaging said diaphragm spring for clamping said diaphragm spring between said air feeder and said fulcrum land on said pressure plate and for holding said diaphragm spring in engagement with said fulcrum land.

5,072,817

ELECTROMAGNETIC CLUTCH

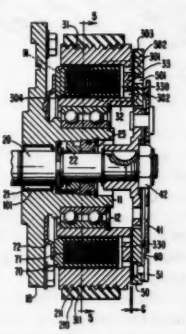
Keiichi Shimura, Isesaski, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Jun. 22, 1990, Ser. No. 542,040

Claims priority, application Japan, Jun. 22, 1989, 1-72450[U]

Int. Cl.[5] 192 *107 R;* **335** *296;* **F16D** *27/112*

U.S. Cl. 192—84 C **23 Claims**



1. In an electromagnetic clutch including a first rotatable member, a second rotatable member, an annular armature plate of magnetic material connected to said rotatable member so that said annular armature plate is capable of limited axial movement and an electromagnet, said first rotatable member comprising a first cylindrical annular portion, a second cylindrical annular portion concentrically disposed within said first cylindrical annular portion and an annular end plate of magnetic material connecting one axial end of each of said first and second cylindrical annular portions, said first and second cylindrical annular portions and said annular end plate defining an annular cavity, said annular end plate being provided with a plurality of arcuate slits which are disposed on at least one circle concentric with said cylindrical annular portions and a plurality of remaining regions located between adjacent arcuate ends of said slits, said annular armature plate facing said annular end plate of said first rotatable member with an axial air gap therebetween, said electromagnet being disposed within said annular cavity and operable to attract said annular armature plate into contact with said annular end plate such that the rotation of said first rotatable member can be transmitted to said second rotatable member through said annular armature plate when said electromagnet is activated, the improvement comprising:

said remaining regions of said annular end plate being axially thicker than substantially all other portions of said annular end plate.

5,072,818

ELASTIC CLUTCH

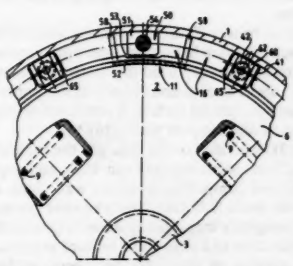
Viktor Kuhne, Bopfingen, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Mar. 12, 1990, Ser. No. 492,092

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1989, 3909234

Int. Cl.[5] F16D *3/14, 47/02*

U.S. Cl. 192—106.1 **16 Claims**



1. An elastic disk clutch for a dual mass flywheel for an internal combustion engine comprising:

a first clutch half including two side disks that are rigidly connected together on their circumference,

a second clutch half formed by a center disk connected to a hub, said clutch halves being connected together by means of elastic clutch elements and being rotatable relative to each other,

said side disks defining a fluid-tight interior space containing a damping medium, said center disk being received within said interior space,

at least one displacement chamber located in the radially outer area of the interior space and contained between said side disks, said displacement chamber containing the damping medium and being variable in volume as said clutch halves rotate relative to each other,

a capsule connected to said first clutch half and including defining walls and a first cam that is oriented radially inward and protrudes into said displacement chamber thereby subdividing said displacement chamber into two partial chambers,

a second cam means on said second clutch half that is oriented radially inward and plunges into said capsule in the area of the defining walls and at a large angle of relative rotation between said clutch halves,

said second cam means including at least one friction ele-

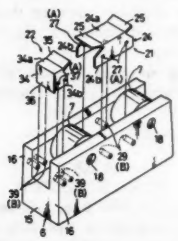
ment which is in elastic and sealing contact with said defining walls when said second cam means plunges into said capsule.

5,072,819

ROLLER CONVEYOR DEVICE AND SCRAPER FOR ROLLER

Sohei Yamada, and Hatsuo Orihashi, both of Kobe, Japan, assignors to Kabushiki Kaisha Kosmek, Kobe, Japan

Filed May 21, 1991, Ser. No. 703,762
Claims priority, application Japan, Jun. 5, 1990, 2-59950[U]
Int. Cl.[5] B65G *13/00*
U.S. Cl. 193—35 R **9 Claims**



1. A roller conveyor device comprising:

a conveyance rail (**6**) having opposite fore and back sides and opposed left and right sides;

left and right support walls (**16**)(**16**) provided in said conveyance rail (**6**), each of which having an upper surface and an inside surface and being elongated in the fore and back direction;

a plurality of rollers (**7**) arranged in the fore and back direction, each of which having an outer peripheral surface and being rotatably supported by both said support walls (**16**)(**16**) under such a condition that the upper portion of said outer peripheral surface is projected above the upper surfaces of said support walls (**16**)(**16**);

scrapers (**21**) provided on the fore and the back sides of each roller (**7**) respectively between both said support walls (**16**)(**16**) and comprising an upper wall (**24***a*), a left and a right side walls (**24***b*)(**24***b*) and a scraper portion (**25**) projected integrally from said upper wall (**24***a*) in the fore and back direction and adapted to be kept in contact with the upper portion of the outer peripheral surface of each roller (**7**);

an engaged portion (A) provided in each said side wall (**24***b*); and

an engaging portion (B) adapted to receive said engaged portion (A) and provided in the inside surface of each said support wall (**16**).

5,072,820

ESCALATOR HANDRAIL STOP DEVICE

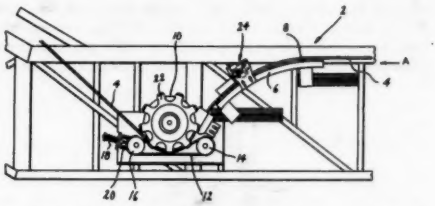
Matthias Steffen, Kirchbrak, and Gerald Wente, Pohle, both of Fed. Rep. of Germany, assignors to Otis Elevator Company, Farmington, Conn.

Filed May 14, 1991, Ser. No. 700,005
Int. Cl.[5] B66B *29/00*
U.S. Cl. 198—323 **6 Claims**

1. An escalator safety assembly for monitoring escalator handrail movement, said assembly comprising:

(a) means for producing a pulsed signal in response to movement of the handrail, said pulsed signal having a pulse rate which is proportional to the speed of movement of the handrail, said means for producing a pulsed signal comprising a roller contacting the handrail for rotation responsive to movement of the handrail, said roller carrying a metal plate fastened to a side of the roller;

(b) a sensor for monitoring said pulse rate, said sensor being operably connected to a power source for the escalator, and said sensor being operable to initiate an interruption of power from said power source when said pulse rate lies outside of a predetermined range corresponding to a range of acceptable handrail velocities and said sensor comprising an induction proximity sensor disposed adjacent to said roller; and



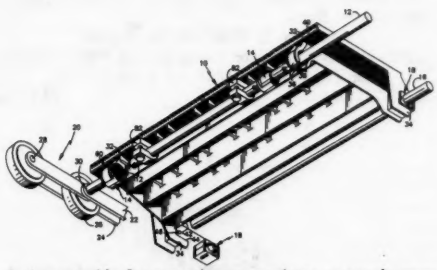
(c) audible alarm means connected to said sensor and actuable by the latter when said pulse rate initially strays from said predetermined range and prior to interruption of power.

5,072,821

ESCALATOR/PEOPLE MOVER BEARING

Michael Kruse, Minden, and Hans-Dietrich Riedel, Berlin, both of Fed. Rep. of Germany, assignors to Otis Elevator Company, N.J.

Filed Dec. 7, 1990, Ser. No. 624,006
Int. Cl.[5] B66B *23/12*
U.S. Cl. 198—327 **6 Claims**



1. An assembly for mounting an escalator or people mover step or pallet to a drive chain, said assembly comprising:

a shaped surface attaching to said step or pallet,

an axle for rotatably supporting said step or pallet, said axle being received within said shaped surface, said axle attaching to and being driven by said drive chain, and

a bearing disposed between said axle and said shaped surface, said bearing having;

an internal bearing surface for supporting said axle,

an external shape for cooperating with said shaped surface such that said bearing does not rotate relative to said shaped surface, and

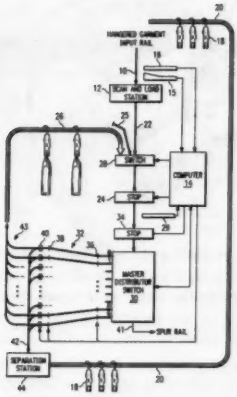
a first mating portion and a second mating portion, said first and second mating portions cooperating such that said bearing may be inserted between, and removed from between, said bearing surface and about said axle without detaching said axle from said chain.

5,072,822

ARTICLE SORTING SYSTEM

Barry W. Smith, Dallas, Tex., assignor to Fabri-Check, Inc., Dallas, Tex.

Filed Jun. 20, 1990, Ser. No. 541,282
Int. Cl.[5] B65G *37/00*
U.S. Cl. 198—349 38 Claims



1. An article sorting system, comprising:
a first type rail for transporting unsorted articles;
a plurality of second type rails for transporting the articles;
at least one carrier carried by said first and second type rails for supporting said articles transported in said system;
a distributor switch mechanism connected between said first type rail and said second type rails for selectively distributing each article from said first type rail to a desired one of said second type rails;
a controller operative to operate said distributor switch mechanism for distributing articles from said first type rail to said second type rails according to a predefined algorithm to accomplish a partial sort; and
a return rail for returning articles sorted on said second type rails to said first type rail to be redistributed by said distributor switch mechanism for subsequent sorting to accomplish a desired sort.

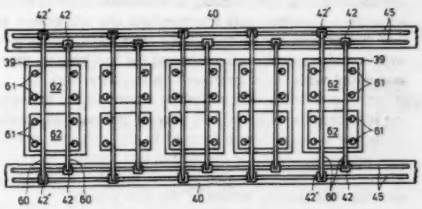
5,072,823

TRANSFER METHOD AND DEVICE AND DRIVING SYSTEM THEREFOR FOR TRANSFER PRESSES

Yoshio Takahashi; Mitsuo Sudo, both of Yokohama; Takamasa Arikawa, Kawasaki; Kenji Nakamura, Kamakura; Izumi Sato, Yokosuka; Katsuyuki Onogi, Yokohama; Takao Iura, Yokosuka, and Nobuji Ishida, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 260,449, Oct. 20, 1988, Pat. No. 4,995,505.
This application Jun. 27, 1990, Ser. No. 544,847
Claims priority, application Japan, Oct. 31, 1987, 62-276589; Nov. 13, 1987, 62-287011; Nov. 20, 1987, 62-177370[U]; Nov. 20, 1987, 62-177372[U]; Nov. 20, 1987, 62-177373[U]; Nov. 20, 1987, 62-293203; Dec. 19, 1987, 62-198888[U]; May 9, 1988, 63-112090
Int. Cl.[5] B65G *25/04*
U.S. Cl. 198—468.4 4 Claims

1. A transfer device for transfer presses comprising a pair of parallel guides extending in the direction of a processing line on both sides of an array of press die assemblies, said guides being adapted to be maintained stationary at least during the transfer of a work, a plurality of paired trolleys, each pair of trolleys on one side of the press die assemblies being cooperatively interconnected to an opposite pair of trolleys on the opposite side of the press die assemblies and spaced apart from each other by a distance substantially equal to that between the adjacent die assemblies, said paired trolleys being in two trains for each side of the press die assemblies said two trains of paired trolleys being reciprocably movable along each guide in



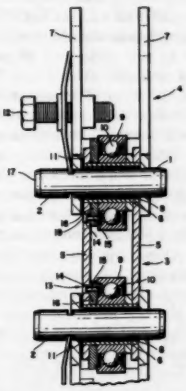
the direction of said processing line, single work supporting means vertically movably mounted above opposing paired trolleys, and work holding means attached to said single work supporting means.

5,072,824

ENDLESS CHAIN FOR A TRAVELING WEB TRANSPORT ASSEMBLY OF A TEXTILE MACHINE

Manfred Röntgen, Mönchen-Gladbach, Fed. Rep. of Germany, assignor to A. Monforts GmbH & Co., Mönchen-Gladbach, Fed. Rep. of Germany

Filed May 23, 1990, Ser. No. 527,284
Claims priority, application Fed. Rep. of Germany, May 23, 1989, 3916714
Int. Cl.[5] B65G *45/02*
U.S. Cl. 198—500 6 Claims



1. In a traveling web transport assembly of a textile machine of the type having a plurality of web engaging members mountable on an endless chain for movement therewith for engaging one edge portion of a web of textile material, said endless chain comprising:
a plurality of hub members, each hub member having an open ended cylindrical chamber;
a plurality of spaced cylindrical pin members, each pin member being disposed in one of said chambers for free rotation therein about the axis of said cylindrical chamber and each pin member projecting beyond the ends of its associated chamber;
a plurality of spaced pin link components each interconnecting an adjacent pair of pin members;
a plurality of spaced hub link components alternating with said spaced pin link components and each interconnecting an adjacent pair of hub members;
guide roller means mounted to each said hub member, each

said guide roller means including an outer roller element and a ball bearing means movably supporting said outer roller element on the respective hub member for rotation about the respective chamber axis, the hub link component associated with each respective hub member being connected to the hub member at a location relative to said respective chamber axis intermediate the respective pin link component connected to the associated pin member within said respective chamber and the ball bearing means associated with the respective hub member; and

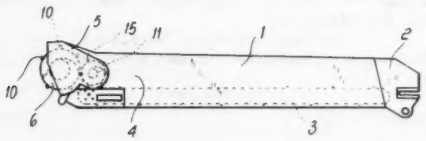
lubrication conduit means including a conduit for introducing lubricant to each said ball bearing means, said conduit including a throughbore formed in the hub link component associated with the respective hub member at a radial spacing from the associated pin link member and opening into the ball bearing means of the hub member.

5,072,825

DRAWING AND CONVEYING ARM

Tiziano Faccia, Via Padova 102, 35026 Conselve (Prov. Padova), Italy

Filed Jun. 21, 1990, Ser. No. 541,697
Claims priority, application Italy, Jun. 28, 1989, 41643 A/89
Int. Cl.[5] B65G *65/22*
U.S. Cl. 198—513 **5 Claims**



1. Drawing and conveying arm comprising a box-like duct means defining an inlet end and an outlet end, a conveyor means being arranged inside said duct means and extending from said inlet end to said outlet end of said duct means, a drawing inlet being arranged at said inlet end of said duct means and being in the form of a hopper, a first mill being provided with shredding cutter means and being rotatably mounted at said drawing inlet, and a second rotor element being rotatably mounted at said drawing inlet in a position toward said outlet end of said duct means with respect to said first mill, said second rotor element being arranged in a parallel position with respect to said first mill and being arranged proximate thereto, said first mill and said second rotor element being rotatable in mutually opposite directions during a working mode of said drawing and conveying arm, said first mill and said second rotor element being removably mounted at said drawing inlet thereby to allow drawing and cutting of fibrous elongated products when said first mill and said second rotor element are mounted at said drawing inlet and to further allow drawing of farinaceous products through said hopper when said first mill and said second rotor element are removed from said drawing inlet, said drawing and conveying arm further comprising locking means for selectively locking a rotation of said second rotor element, whereby a reverse rotation of said first mill opposite to a normal working mode rotation thereof during a locked position of said second rotor element allows to free any accumulated material from between said first mill and said second rotor element.

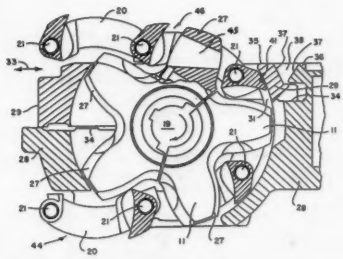
5,072,826

CHAIN CONVEYOR FOR MINER

Edward Wechner, Minnamurra, Australia, assignor to Joy Technologies Inc., Pittsburgh, Pa.

Continuation of Ser. No. 162,836, Mar. 3, 1988, Pat. No. 4,919,252. This application Feb. 16, 1990, Ser. No. 481,014
Claims priority, application Australia, Mar. 5, 1987, PI0701
Int. Cl.[5] B65G *65/06*
U.S. Cl. 198—520 **1 Claim**

1. The improved chain conveyor of the type having a drive sprocket at one end of the conveyor, a parallel idler sprocket at the opposite end of the conveyor, and one or more links of chain engaged over the sprockets providing a moving surface for the conveying of particulate material, wherein the improvement comprises an entry casting adjacent and movably mounted on the drive sprocket having a pair of arcuate U-



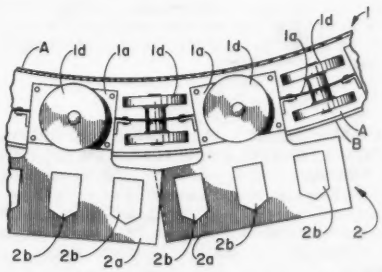
shaped channels extending therethrough, one of said channels being positioned on each side of the drive sprocket configured to receive and guide the chain as it passes through the entry casting such that at the location of the drive sprocket the movement of the chain is limited to movement in the drive direction.

5,072,827

SEGMENTED BELT FOR USE ON BOX-TYPE SINGLE-RAIL OVERHEAD CONVEYORS

Angusto Santicchi, Strada San Andrea delle Fratte., 06100-Perugia Fraz. San Sisto, Italy

Filed Jan. 23, 1991, Ser. No. 644,524
Claims priority, application Italy, Mar. 14, 1990, 611 A/90
Int. Cl.[5] B65G *17/32*
U.S. Cl. 198—678.1 **2 Claims**



1. A segmented conveyor belt for used on overhead single bo conveyor systems characterized by:

a transport, support and guide modular chain (**1**)—which slides in the single box-type rail (A)—consisting of many identical trolleys placed on alternating orthogonal planes; each of these trolleys consisting of a thin and flexible rectangular metal plate (**1***a*) at whose opposite transverse sides the number of "L" shaped brackets (**1***b*) are fitted while at the centre of each of these plates (**1***a*) there is a through pin (**1***c*) which acts as the support of a pair of idle running opposing wheels (**1***d*) whose diameter is greater than the height of the plate (**1***a*);

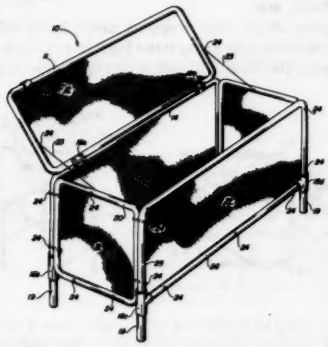
a segmented and laminate support structure (**2**) consisting of many laminate slotted elements (**2***a*), aligned edgewise and placed close together, each hung from one of the trolleys of the chain (**1**) whose plates (**1***a*) is in vertical postion.

5,072,828

KNOCK-DOWN ROADSIDE TRASH PROTECTOR

Earl L. Irvine, 11071 E. Terry St., Bonita Springs, Fla. 33923

Filed Apr. 1, 1988, Ser. No. 176,661
Int. Cl.[5] B65D *6/08*
U.S. Cl. 220—4.33 2 Claims



1. A readily assembled container for holding trash comprising

six rectangular panels each consisting of a frame made of hollow pipe and a rectangular section of galvanized wire cloth attached to the frame,

five of the rectangular panels being designed and sized to be joined together by a plurality of bolts to form the four sides and bottom of said container, and

the sixth panel being designed and sized to form a cover for the container joined to the frame of one of the said panels by a pair of hinges,

four hollow T-shaped fittings each of which forms a bottom corner of the frame of two oppositely disposed side panels and which includes a downwardly facing open socket, and

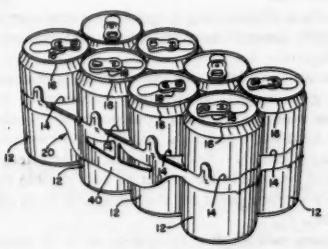
four legs for supporting the container designed to fit into the four sockets located at the four bottom corners of the assembled container.

5,072,829

CARRIER STOCK WITH INTEGRAL HANDLES

Leslie S. Marco, Bloomingdale, and Robert Olsen, Medinah, both of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.

Continuation-in-part of Ser. No. 519,858, May 7, 1990. This application Mar. 14, 1991, Ser. No. 669,491
Int. Cl.[5] B65D *75/56, 71/00*
U.S. Cl. 206—162 6 Claims



1. Carrier stock for machine application to substantially identical containers, said stock being formed from a single sheet of resilient polymeric material and being severable to form individual carriers with separate apertures to receive the individual containers and with integral handles, said stock being formed for each individual carrier with

(a) integrally joined band segments defining the separate apertures and including outer segments that extend generally in a longitudinal direction along a first edge of the carrier when the stock is unstressed, outer segments that extend generally in a longitudinal direction along a second edge of the carrier when the stock is unstressed, and cross segments that extend generally in a transverse direction when the stock is unstressed, the first edge being opposite to the second edge, and

(b) an integral handle having two ends, which are joined respectively to outer segments along the first edge,

wherein selected ones of the cross segments have weakened lines extending generally in a transverse direction when said stock is unstressed and dividing the segments having said lines into half segments, said lines facilitating severance of said stock to form the individual carriers, and wherein each half segment joined to one of the outer segments along the first edge has an aperture-defining edge configured so as to define a nub constituting means for countering tendencies of such half segment when stressed to neck down or to break.

5,072,830

PROCESS FOR OBTAINING A PACKAGE CONTAINING MUTUALLY REACTIVE PARTICULATE MATERIALS

Kaj Nielsen, Tranbjerg, Denmark, assignor to Deltagraph A/S, Ringsted, Denmark

Continuation of Ser. No. 127,058, Dec. 1, 1987, abandoned, which is a continuation of Ser. No. 843,598, Mar. 25, 1986, abandoned. This application Jun. 18, 1990, Ser. No. 538,699
Claims priority, application Denmark, Mar. 28, 1985, 1406/85
Int. Cl.[5] B65D *81/32*
U.S. Cl. 206—219 12 Claims

8. A package of solid particulate photographic materials for use in the development of exposed photographic films which includes a sealed, evacuated envelope that defines a single chamber and at least three immobilized layers of solid particulate photographic materials contained in said envelope, at least two of said materials being mutually reactive and at least one of said materials being inert relative to said two which are mutually reactive, said layers of said at least two mutually reactive materials being separated by at least one intervening layer of said inert material, said package being made by the steps of:

(a) providing an envelope suitable for vacuum packaging which defines a single chamber therein,

(b) providing at least three solid particulate photographic materials, at least two of which are mutually reactive and at least one of which is inert relative to said two which are mutually reactive,

(c) separately introducing said solid particulate photographic materials into said single chamber in said envelope such that solid photographic materials which are mutually reactive are placed in separate layers within said envelope and are separated by at least one intervening layer of solid particulate material which is inert relative to each adjacent layer of said materials while within the envelope,

(d) evacuating said envelope of air, and

(e) sealing said evacuated envelope, thereby immobilizing said layers of solid particulate materials relative to one another.

5,072,831

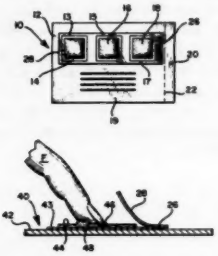
RUB-OFF ADVERTISING SAMPLER AND METHOD OF MANUFACTURE

Michael A. Parrotta, Hamilton Square; Frederick Grainger, West Greenbrook, and Donald Schoenleber, Bellemead, all of N.J., assignors to Webcraft Technologies, Inc., North Brunswick, N.J.

Continuation of Ser. No. 721,769, Apr. 10, 1985, abandoned. This application Mar. 17, 1988, Ser. No. 170,624

Int. Cl.[5] A45D *40/22*

U.S. Cl. 206—232 **10 Claims**



1. A rub-off cosmetic advertising sampler produced from a continuous web, comprising:

(a) A flat, printed sheet of paper stock which is one of a series of identical pieces obtained from the web;

(b) the sheet having a transfer layer receiving and rub-off section surface having a smooth, oil-impermeable surface substantially less than the area of the sheet but large enough to accommodate engagement and movement of a finger tip in a rubbing stroke;

(c) a solid relatively thick transfer layer which is a dried residue of a semi-liquid transfer layer composition disposed on the smooth oil impermeable surface of the receiving and rub-off section;

(d) the transfer layer being readily removable from the receiving section by a finger tip on which it accumulates as a uniform cream-like substance readily spreadable on the skin;

(e) the transfer layer, having a high percentage of cosmetic powders, mixed with a binder and waxy oil-like constituents;

(f) the paper sheet having printed matter thereon, referring to the product associated with the transfer layer;

(g) a protective flat covering piece integrally connected with the flat sheet and extending over and covering the transfer layer to protect it during handling; and

(h) the covering piece being readily movable from its protective over-lying position to give immediate access to the then un-covered transfer layer surface.

5,072,832

MULTIPURPOSE SHAPED PITCHER AND SURGICAL KIT AND WRAP SYSTEM

A. H. Llynn Valentine, Granada Hills, and William L. Noack, Camarillo, both of Calif., assignors to Devon Industries, Inc., Chatsworth, Calif.

Division of Ser. No. 321,224, Mar. 9, 1989, Pat. No. 4,925,047. This application Feb. 6, 1990, Ser. No. 475,779

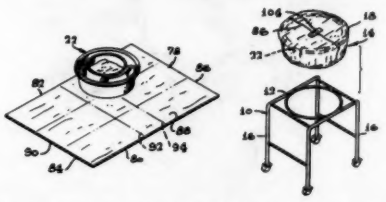
Int. Cl.[5] B65D *69/00*

U.S. Cl. 206—570 **7 Claims**

1. A surgical kit wrap system comprising:

a surgical kit to be wrapped, ai surgical kit including a substantially circular close bottom basin for mounting in a ring stand and surgically useful materials within said basin, said basin having a first radius, said surgically useful materials including a kidney-shaped pan within said basin and a pitcher, said pan having a tapered wall with a portion thereof at the first radius and a portion thereof indented at a second radius, said pitcher having walls and bottom to define a closed bottom, open topped pitcher symmetrical about a center plane, a portion of said walls being curved about said fist radius and a portion of said walls being curved about said second radius, sasi kidney-shaped pan and said pitcher being sized so that when said wals at said second radius are in engagement, said walls at said first radius both lie substantially in contact with the walls of said basin; and

a wrapping drape, said wrapping drape being sufficiently wide to drape over a ring stand from front to back without reaching the floor and said wrapping drape being sufficiently long to lengthwise sufficiently cover a double ring stand without reaching he floor so that said wrapping drape is rectangular, and a double transverse fol width wise across said wrapping drape so as to effectively shorten the length of said wrapping drape so that with said double transverse fold in place, said wrapping drape is adequately long to properly lengthwise cover a single ring stand without reaching the floor, said wrapping drape being wrapped around each of said basin and said materials in said basin so as to enclose and protect each of said basin and said materials within said basin.



5,072,833

METHOD OF COLLECTING RECYCLABLE MATERIALS

David Hansen, West Sand Lake, and Patrick F. Mahoney, Rensselear, both of N.Y., assignors to EAC Systems, Inc., Albany, N.Y.

Filed May 10, 1989, Ser. No. 350,085

Int. Cl.[5] B07C *5/02;* **B30B** *13/00;* **B65D** *30/04*

U.S. Cl. 209—3.3 **16 Claims**

1. A method of collecting recyclable materials for recovery at a recyclable material recovery facility, said method comprising the steps of:

(a) placing recyclable material into a flexible receptacle having a rugged construction sufficient to withstand forces experienced under compaction even when filled with solid waste materials, said flexible receptacle further having a visually detectable means on the exterior of said flexible receptacle for rendering said flexible receptacle highly visible against and distinguishable from other solid waste;

(b) closing said flexible receptacle so as to prevent said recyclable material from escaping from said flexible receptacle during compaction, transfer and dumping operations;

(c) compacting said flexible receptacle and said recyclable material therein without destroying the integrity of said flexible receptacle; and

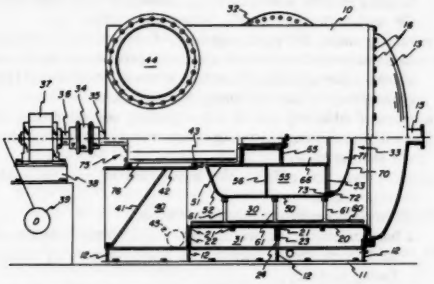
(d) delivering said flexible receptacle to a delivery point.

5,072,834

SCREENING APPARATUS FOR PAPER MAKING STOCK

David E. Suica, Cincinnati; Michael F. Kinne, Trenton, and Gary S. Williamson, Middletown, all of Ohio, assignors to The Black Clawson Company, Middletown, Ohio

Filed Nov. 19, 1990, Ser. No. 615,209
Int. Cl.[5] B07B *1/20*
U.S. Cl. 209—273 7 Claims



1. Apparatus for screening paper making stock comprising:
(a) a tubular housing,
(b) a perforate screening cylinder supported within and separating the interior of said housing into a screening chamber within said cylinder and an annular accepts chamber between said cylinder and said housing,
(c) means defining an inlet chamber within one end of said housing which is connected with the adjacent end of said screening chamber and has an inlet port leading thereto from outside said housing,
(d) a door removably secured to the other end of said housing and closing the other end of said screening chamber,
(e) means forming an outlet port from said accepts chamber,
(f) means forming a reject outlet port from said screening chamber,
(g) a rotor assembly received within said screening cylinder,
(h) drive means for said rotor assembly outside said housing and including a drive shaft extending into said housing through said inlet chamber,
(i) means securing said rotor assembly on said drive shaft,
(j) bearing means fixed with relation to said housing and supporting said drive shaft and said rotor assembly for rotation within said cylinder,
(k) said rotor assembly including tubular outer and inner walls and end walls cooperating to enclose a sealed space,
(l) vane means mounted on the outside of said outer wall for generating alternating positive and negative pressure waves adjacent the ends of the perforations in said screening cylinder in response to rotation of said rotor assembly, and
(m) said sealed space being of predetermined volume providing said rotor assembly with buoyancy substantially counterbalancing the weight of said rotor assembly when said housing is filled with stock.

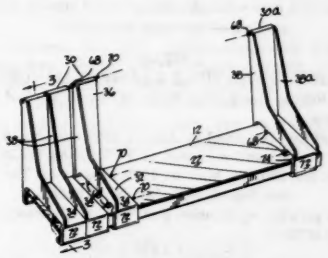
5,072,835

TAPE CARTRIDGE HOLDER

Macy J. Price, Jr., Louisville; Laurence G. Ball, Denver, and Mack E. Johnson, Arvada, all of Colo., assignors to Engineered Data Products, Inc., Broomfield, Colo.

Filed Jun. 12, 1990, Ser. No. 536,729
Int. Cl.[5] A47G *29/00*
U.S. Cl. 211—40 20 Claims

1. Apparatus for forming a compartment for holding an article comprising:
at least one elongated shelf having a longitudinal axis;
said elongated shelf having a support surface and a pair of longitudinally extending integral flange portions depending from opposite sides of said support surface;
said support surface having a length and a width;
support means for supporting said elongated shelf at a relatively fixed location;
at least one compartment forming member;
said compartment forming member having a base portion having a width greater than said width of said support surface;
a pair of integral flanges depending from opposite sides of said base portion;



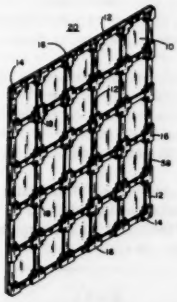
mounting means for mounting said compartment forming member on said elongated shelf; and
integral support means depending from said base portion and located between said pair of flanges for contacting said support surface to support said compartment forming member on said elongated shelf with at least a portion of said base portion spaced from said support surface and with said flange portions and said flanges in a juxtaposed relationship.

5,072,836

RACK FOR COMPACT DISKS OR TAPE CASSETTES

Jan S. Gross, 4903 San Jose St., Tampa, Fla. 33629

Filed Jan. 7, 1991, Ser. No. 637,778
Int. Cl.[5] A47B *63/00*
U.S. Cl. 211—40 9 Claims



1. A wall mountable storage rack for compact disk cases comprising an open framework forming a plurality of adjacent rectangular receptacles being sized to accept a compact disk case when the case is oriented with one of the disk case's largest surfaces facing outward of the rack, each of the rectangular receptacles being formed from four elongated side members releasably joined to four corner members, preselected ones of the corner members being connectable to other elongated side members for forming the adjacent receptacles;
each of said corner members including a flange adjacent a rear edge thereof, said flange extending a preselected distance into a receptacle defined in part by a corresponding one of said corner members, said flange engaging a rear surface of a compact disk case when the disk case is inserted into a receptacle for positioning an outwardly

facing surface of the case in a preselected orientation with respect to an outwardly facing surface of the storage rack; and

at least one releasable latch in each of the receptacles for releasably retaining a disk case within the receptacle in an abutting position against said flange, said at least one latch comprising a spring member positioned between an edge of a respective one of the disk cases and one of said corner and side members for urging the case toward an opposite side member, said spring member having an end urged into overlapping a portion of the outwardly facing surface of the disk case when the case is seated against said flange.

5,072,837

HINGED MULTIPLE GARMENT HANGER

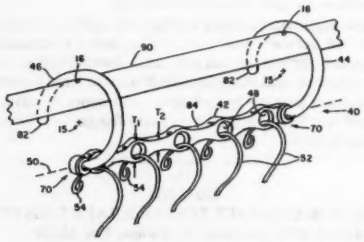
Wilhelm Rösch, Hinzbecker Höhe 30, Essen 15, Fed. Rep. of Germany

Division of Ser. No. 389,124, Aug. 3, 1989, Pat. No. 4,195,371, which is a continuation-in-part of PCT/DE88/00420, Jul. 7, 1988, Ser. No. 360,886, May 24, 1989, abandoned. This application Sep. 4, 1990, Ser. No. 578,658

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 8712870[U]

Int. Cl.[5] **A47F** *5/00*

U.S. Cl. 211—116 **15 Claims**



1. A multiple garment hanging device for simultaneously hanging and storing a plurality of articles of clothing or the like on a plurality of clothes hanging elements, said garment hanging device comprising:

a bar defining opposite ends thereof:

said bar defining a plurality of holes therethrough for receipt of the clothes hanging elements therein;

a pair of hook;

each said hook substantially defining a circle;

each said hook having a pivot end;

said pivot end of each said hook having a pivot axis;

each said hook having a portion of its corresponding said circle being substantially adjacent to its corresponding said pivot axis;

each said pivot axis being substantially tangential to said adjacent portion of said circle; and

said pivot end of each said hook being pivotally mounted at one of said opposite ends of said bar.

5,072,838

TAPE CARTRIDGE STORAGE SYSTEM

Macy J. Price, Jr., Louisville; Mack E. Johnson, Arvada, and Daniel C. Starkey, englewood, all of Colo., assignors to Engineered Data Products, Inc., Broomfield, Colo.

Continuation-in-part of Ser. No. 343,952, Apr. 26, 1989, abandoned. This application Jul. 6, 1990, Ser. No. 551,131

Int. Cl.[5] **A47F** *5/00*

U.S. Cl. 211—162 **14 Claims**

1. Apparatus for use in the storage and retrieval of tape cartridges comprising:

a stationary storage rack having a plurality of horizontally-extending shelves which are equally spaced-apart in a vertical direction;

each of said shelves supporting a plurality of equally-sized tape cartridge storage holder units in a side-by-side relationship with the tape cartridges in said holder units facing outwardly;

at least two movable storage racks located in front of said stationary storage rack;

each of said movable storage racks having a plurality of horizontally-extending shelves which are equally spaced-apart in a vertical direction;

each of said shelves being dimensioned to receive and support at least one tape cartridge storage holder unit similar to said plurality of tape cartridge storage holder units with the tape cartridges therein facing outwardly;

mounting means for mounting each of said movable storage racks to permit movement thereof to provide for access to at least some of said tape cartridge storage holder units on said shelves of said stationary storage rack;

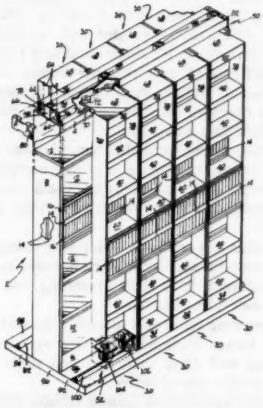
alignment adjusting means for adjusting the alignment of each of said movable storage racks relative to said stationary storage rack;

guide means for guiding the movement of said movable storage racks;

wherein said mounting means comprise:

a base extending outwardly from said bottom portion of said fixed storage rack means and having an upwardly facing surface;

track means on said base for guiding each of said movable



storage rack means for movement over said upwardly facing surface; and

at least two spaced apart wheels mounted on said bottom portion of each of said movable storage rack means and located to be in contact with said upwardly facing surface to permit rolling movement of each of said movable storage rack means over said upwardly facing surface;

one of said at least two spaced-apart wheels rotates around a fixed axle;

the other of said at least two spaced-apart wheels rotates around an axle that is adjustable;

wherein said adjusting means comprises:

a pivot rod mounted at a fixed location;

a pair of spaced-apart lever arms mounted for pivotal movement on said pivot rod;

said adjustable axle mounted on opposite end portions of said lever arms on one side of said pivot rod;

force applying means for applying a force to opposite end portions of said lever arms on the other side of said pivot rod to pivot said adjustable axle;

wherein said force applying means comprise:

a rod extending between and mounted on said opposite end portions of said lever arms on said other side of said pivot rod;

a support mounted at a fixed location and having an opening extending therethrough;

a movable member mounted for movement toward or away form said support and having a threaded opening extending through a portion thereof;

said rod mounted on said movable member for movement therewith and located at a location spaced from said threaded opening;

a threaded bolt having an enlarged head portion passing through said opening and in threaded engagement with said threaded opening;

said other wheel applying a force on said lever arms to urge said enlarged head portion into contact with the portions of said support surrounding said opening;

said enlarged head portion having a configuration to receive a tool for rotating said threaded bolt to move said movable member relative to said support to move said rod to move said lever arms around said pivot to adjust said adjustable axle; and

wherein said movable member comprises:

an inverted U-shaped member having a base and two spaced-apart legs;

a block secured to said base and located between said spaced apart legs;

said threaded opening extending through said block;

each of said spaced-apart legs having an opening formed therein; and

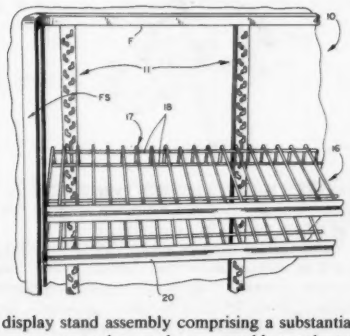
said rod passing through said openings in said legs.

5,072,839

DISPLAY STAND ASSEMBLY

A. Jeanne Arnone, Rockford, Ill., assignor to Myco, Inc., Rockford, Ill.

Filed Nov. 28, 1990, Ser. No. 619,136
Int. Cl.[5] A47F *5/00*
U.S. Cl. 211—187 **11 Claims**



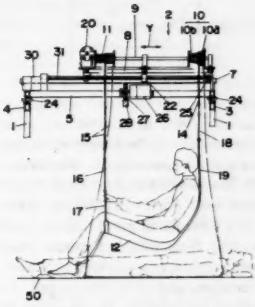
1. A display stand assembly comprising a substantially stationary support member, and a removable product-support unit mounted for selective vertical adjustment on said support member, said member including an exposed upright surface having a plurality of slots formed therein and arranged in at least a pair of substantially parallel upright rows, the slots in one row being vertically offset with respect to the slots in the other row, each slot in a row having an upright first section and a second section extending laterally from a lower end portion of the first section, each second section having a distal end portion, the distal end portions of the slots in said row being substantially vertically spaced; said product support unit having a first means projecting outwardly from the exposed surface of said upright support member, and an attaching means disposed at and protruding from a peripheral segment of said first means, said attaching means including a finger-like element having a substantially horizontal inner portion affixed to and protruding from said peripheral segment and an upright outer portion spaced from said peripheral segment, said inner and outer portions defining a substantially vertical plane and being dimensioned whereby said portions are passable substantially horizontally through a selected slot only when said portions are in registry with the slot first section, said attaching means being in interlocking engagement with the support member when said portions pass through the slot first section and then are shifted laterally along the slot second section until the attaching means inner portion is disposed in the slot distal end portion and the outer portion slidably engages a concealed surface of the support member.

5,072,840

MEDICAL BED APPARATUS

Yoshio Asakawa, No. 287, Tsufuku-Honmachi, Kurume-shi, Fukuoka-ken, Japan, and Yasunaga Suezaki, No. 501-3, Oaza-Kitoin, Yame-shi, Fukuoka-ken, Japan

Filed Jul. 10, 1990, Ser. No. 551,593
Claims priority, application Japan, Dec. 28, 1989, 1-343165
Int. Cl.[5] B66C *17/00, 19/00;* B66D *1/30;* A61G *7/08*
U.S. Cl. 212—205 **4 Claims**



1. A medical bed apparatus having a body frame, a hoisting means provided at the top of said body frame and a hammock hoistable by said hoisting means, said medical bed apparatus comprising:

a first hanging string coupling said hoisting means with a first end of said hammock;

a second hanging string coupling said hoisting means with a second end of said hammock;

a feed screw;

a nut slidable along said feed screw;

said hoisting means having a drum means for hoisting said hanging strips whereby the hoisting speed of said first hanging string is faster than that of said second hanging string; said drum means being attached to said nut;

a first motor means for rotating said drum means so that said hammock is hoisted or lowered;

a second motor means for driving said feed screw thereby moving said drum means along said feed screw in cooperation with the hoisting up or down said first hanging string.

5,072,841

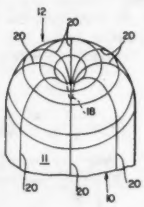
PLASTIC CONTAINERS

Aziz A. Okhai, Dundee, United Kingdom, assignor to Norderney Investments Limited, Saint Helier, United Kingdom

PCT No. PCT/GB87/00102, § 371 Date Dec. 7, 1987, § 102(e) Date Dec. 7, 1987, PCT Pub. No. WO87/04974, PCT Pub. Date Aug. 27, 1987
Continuation of Ser. No. 112,607, filed as PCT/GB87/00102, Feb. 12, 1987 published as WO87/04974 Aug. 27, 1987 abandoned. This application filed Sept. 5, 1990, Ser. No. 557,799.
Claims priority, application United Kingdom, Feb. 14, 1986, 8603709; Feb. 25, 1986, 8604660
Int. Cl.[5] B29C *49/12;* B65D *1/02*
U.S. Cl. 215—1 C **28 Claims**

1. A container of blow-moulded oriented thermoplastic material of the type formed by enclosing a moulded preform in

a mould corresponding to the shape of the container, heating the preform and stretching it to the full length of the mould so that its bottom surface impinges upon the bottom surface of the mould prior to blow-moulding; said container comprising a generally cylindrical body portion with a central longitudinal axis, said body portion having a side wall, a radius and a base portion closing the bottom end of said side wall, wherein said base portion is defined by a figure of rotation formed by rotating a generally convex curve, extending from the bottom end of said side wall to the central longitudinal axis of the body portion, about said axis so as to define an annular, convex surface having a central re-entrant portion, the material in the vicinity of the center of said re-entrant portion being unori-



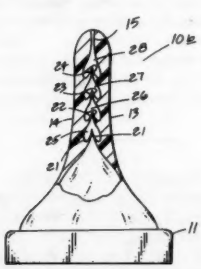
ented and relatively thick in comparison with the oriented material of the remainder of the base portion and wherein said annular, convex surface comprises, in transverse cross-section, first and second downwardly convex portions each comprising an outer, convex wall portion extending downwardly from said side wall to a lowermost point and an inner wall portion extending upwardly from said lowermost point towards the center of the base portion; and wherein said inner wall portions are generally convex, and said unoriented, relatively thick material is confined substantially to the upper most regions of said convex, inner wall portions; and wherein said convex, inner wall portions converge to form a cusp at the center of said base portion, and said unoriented, relatively thick material is confined substantially to the point of said cusp.

5,072,842

ARTIFICIAL NIPPLE CONSTRUCTION

Ray D. White, 1011 Magnolia Dr., Franklin, Tenn. 37064

Filed Oct. 15, 1990, Ser. No. 597,517
Int. Cl.[5] A61J *11/00*
U.S. Cl. 215—11.4 **2 Claims**



1. An artificial nipple construction comprising,

a cylindrical base member, the cylindrical base member including an annular nipple base mounted thereto, the annular nipple base including a concave first side and a concave second side, the concave first and second sides arranged diametrically opposed relative to one another to the annular nipple base, and converge upwardly to a respective first upper tip and a second upper tip, the first and second upper tips including a continuous "U" shaped slit positioned therebetween, and

wherein the first and second sides are each of a hyperbolic configuration converging towards one another, and

wherein the first side includes a first flap fixedly mounted to an interior surface of the first side, and a second flap fixedly mounted to an interior surface of the second side, the first and second flap converged towards one another at a continuous contact line, the contact line orthogonally oriented relative to an axis of the nipple member, and wherein the first and second flaps are of a flexible construction and effects spreading of the first and second flap pairs upon application of a suction interiorly of the nipple member, and

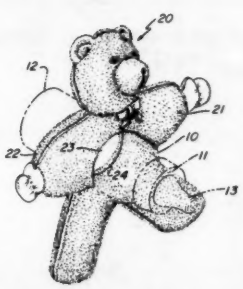
wherein the first and second flaps define a first flap pair, and further including a second flap pair mounted overlying the first flap pair, a third flap pair overlying the second flap pair, and a fourth flap pair overlying the third flap pair, and a first reservoir defined between the first and second flap pair, a second reservoir defined between the second and third flap pair, a third reservoir defined between the third and fourth flap pair, and a fourth reservoir defined between the fourth flap paid and the "U" shaped slit.

5,072,843

HOLDER FOR INFANT FEEDING DEVICE

Bonnie L. James, 237 Birch Rd., Tuckerton, N.J. 08087

Continuation-in-part of Ser. No. 414,370, Sep. 29, 1989, abandoned. This application Sep. 5, 1990, Ser. No. 578,048
Int. Cl.[5] A61J *9/06*
U.S. Cl. 215—100 R **4 Claims**



1. A holder for holding a generally cylindrical bottle having a closed end and an open end including a nipple for use in feeding an infant, the holder comprising:

a soft, cuddly, plush support member including a body having a front surface and a rear surface, a head extending outwardly from the body and four appendages extending outwardly from the body at spaced locations, the body, head and appendages cooperating to form a three dimensional figure of a type suitable for providing amusement to an infant during feeding; and

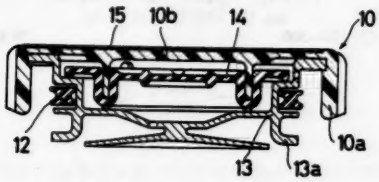
a generally circular opening extending completely through the body from its front surface to its rear surface, the opening located proximate the center of the body and being sized for receiving the bottle, the opening including a bottle gripping portion formed of a generally non-expandable ring-like member having an inner diameter at least slightly smaller than the outer diameter of the bottle whereby insertion of the bottle into the opening results in the ring-like member tightly engaging the bottle for gripping and holding the bottle at any selected position along the length of the bottle to permit a desired portion of the open end of the bottle to extend in an upward direction beyond the body and to permit the closed end of the bottle to extend in a downward direction; the body, head and appendages being engageable by the infant to support the bottle at a suitable position to facilitate feeding of the infant while providing amusement to the infant.

5,072,844

RESERVOIR CAP

Toshihiro Nakano, Chiryu, and Hitoshi Tauchi, Kariya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan

Filed Feb. 21, 1991, Ser. No. 658,657
Claims priority, application Japan, Feb. 28, 1990, 02-20799[U]
Int. Cl.[5] B65D *41/00*
U.S. Cl. 215—230 4 Claims



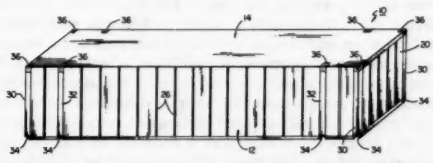
1. A reservoir cap comprising:
a cylinder portion of molded resin for surrounding an outer circumferential surface of an opening portion of a reservoir body;
a flat portion unitarily formed with the cylinder portion for closing the opening portion of the reservoir body, and
a transparent film having an inner surface insert-molded to the flat portion at an outer surface of the flat portion and made from a material identical to that of the flat portion,
wherein descriptive characters which are visible from outside of the reservoir cap are formed at the inner surface of the film.

5,072,845

MODULAR CARGO CONTAINER AND A BOTTOM SUPPORT MEMBER THEREFOR

Charles W. Grogan, Yardley, Pa., assignor to Sea-Land Service, Inc., Iselin, N.J.

Filed Jan. 31, 1991, Ser. No. 648,181
Int. Cl.[5] B65D *88/00*
U.S. Cl. 220—1.5 17 Claims



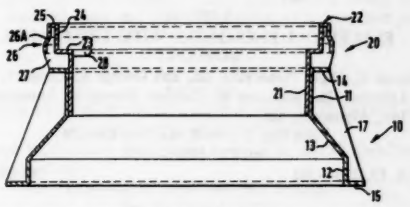
1. A cargo container, comprising a body defining the shape of the container and an interior cargo space, the body including a roof, a floor, front and back walls, left and right side walls, left and right opposite vertical support posts, and left and right opposite bottom support members, wherein the vertical support posts have lateral outside surfaces spaced apart a given distance defining the width of the container, and each bottom support member is connected to a respective one of the vertical support posts, and comprises:
a central body including a lateral outside face defining an opening to facilitate handling the cargo container;
a top lateral flange connected to the central body and extending laterally away from said one outside face, the top lateral flange being connected to and supporting said respective one of the vertical support posts; and
a back lateral flange connected to the central body and extending laterally away from said one lateral outside face;
wherein said openings of the lateral outside faces of the central bodies of the bottom support members are laterally spaced apart less than the width of the container.

5,072,846

UNDERGROUND JUNCTION BOXES

Robert W. Portwood, Fleet, United Kingdom, assignor to Wedge International Limited, Camberley, United Kingdom

Filed Mar. 23, 1989, Ser. No. 327,669
Int. Cl.[5] B65D *87/10*
U.S. Cl. 220—3.3 22 Claims



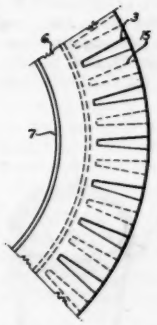
1. A cable junction box, for burial with its top surface flush with the ground, comprising:
a main body having at its upper part a parallel-sided throat and an outwardly extending flange; and
a head portion comprising
a sleeve slidable within the throat of the main body so that the location of the head portion may be vertically adjusted, and
a frame for supporting a cover and attached to and extending outwardly from the upper end of the sleeve to form a space between itself and the flange of the throat into which supporting material may be placed when the location of the head portion has been adjusted.

5,072,847

PAINT CAN POUR LIP

Frank C. Price, 13812 Sand-Hurst Pl., Santa Ana, Calif. 92705-2744

Filed Feb. 2, 1990, Ser. No. 474,549
Int. Cl.[5] B65D *25/48*
U.S. Cl. 220—733 2 Claims



1. An attachment for a circular lip of an open top cylindrical container having a shaped groove for attachment and sealing with a similarly shaped lid, the attachment comprising:
a cover for the container lip in which contents of the container flow over said cover as the contents are being poured, thus preventing the contents from contaminating he container lip, said cover including,
two strips of flexible material comprising,
a first strip with a groove depending portion and a second strip with a groove depending portion, said strips are laid together so that their groove depending portions together fit the shaped groove of the container lip and are inserted therein, each said strip having,
a horizontally outwardly extending flange with cutouts

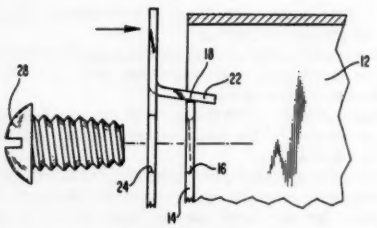
forming a toothed pattern for each flange, said toothed patterns allowing the length of said strips to be bent into an arc conforming to the arc of the container lip, wherein upon the insertion of the strips within the groove, the flanges are arranged one above the other with the cutouts 180 degrees out of phase, resulting in a continuous pour lip formed by the flanges.

5,072,848

ELECTRICAL ENCLOSURE WITH TRIM PANEL SUPPORT

George C. Pipis, Naperville, Ill., and George L. Lambert, III, Lilburn, Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

Filed Sep. 21, 1990, Ser. No. 586,639
Int. Cl.[5] H02G *3/14*
U.S. Cl. 220—241 **10 Claims**



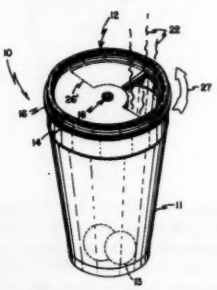
1. An electrical enclosure comprising:
a box having an open side for access to an interior thereof;
a trim panel for covering the box open side;
an aperture formed in one of the box and trim panel proximal a top portion thereof;
a support tab integrally stamped within the aperture and projecting from one of the box and trim panel and
means for engaging the support tab and fully supporting trim panel on the other of the box and trim panel.

5,072,849

CONTAINER AND SUBSTANCE TESTING METHOD

Robert A. Blau, Golden Valley, Minn., assignor to R. Alan Blau & Associates, Inc., Minneapolis, Minn.

Filed Aug. 29, 1990, Ser. No. 574,651
Int. Cl.[5] B65D *51/18*
U.S. Cl. 220—253 **9 Claims**



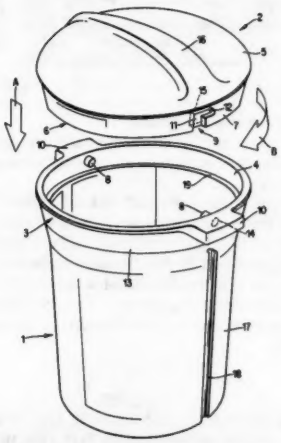
1. A container comprising:
a housing having substantially fluid impermeable walls; and
a cover assembly including first and second substantially identical fluid impermeable lids pivotally interconnected proximate their center for pivotal movement relative to one another, the cover assembly further including a gasket disposed between the first and second lids, the first and second lids and the gasket cooperating with each other to provide a substantially fluid impermeable container, the first and second lids and the gasket including openings alignable with each other to provide an opening into an interior of the container upon rotation of the first and second lids relative to one another.

5,072,850

RECEPTACLE FOR FOODSTUFFS AND THE LIKE

Robert M. Gagnon, 107 Chestnut Hill Rd, Ridgefield, Conn. 06877, and Daniel Carpenter, Box 6A, R.D. 1, Newport, N.Y. 13146

Filed Apr. 25, 1991, Ser. No. 691,380
Int. Cl.[5] B65D *41/06, 21/02*
U.S. Cl. 220—300 **16 Claims**



1. A receptacle for foodstuffs, trash and the like, comprising a container having an open top and including a substantially ring-shaped rim having an internal surface surrounding said open top, and two handles which are outwardly adjacent said rim and are located substantially diametrically opposite each other; a lid having a top portion and an annular skirt depending from said top portion and receivable in said rim, said skirt having an external surface which is adjacent said internal surface when said skirt is received in said rim; and a bayonet mount for separably connecting said skirt to said rim when the skirt is received in said rim, said bayonet mount comprising a plurality of prongs extending from said internal surface and slots provided in said external surface and each receiving one of said prongs when said skirt is received in said rim, said prongs including a first prong adjacent one of said handles and a second prong adjacent the other of said handles.

5,072,851

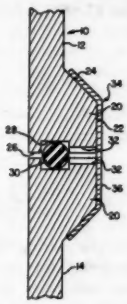
DYNAMIC PRESSURE RELIEF SEAL FOR PRESSURE VESSELS

Robert D. Wilkes, Sanford, N.C., assignor to Essef Corporation, Shaker Heights, Ohio

Filed May 23, 1990, Ser. No. 527,269
Int. Cl.[5] B65D *51/16*
U.S. Cl. 220—366 **6 Claims**

1. A pressure relief seal for pressure tanks having separable container sections adapted to be assembled together to form a pressure chamber and to define a pressure-retaining joint between said sections, said pressure-retaining joint including a seal-receiving cavity formed in part by each of said sections, sealing means in said cavity, means for retaining said sections and said sealing means in a predetermined sealing position up to a predetermined operating pressure, said joint and its seal-receiving cavity being displaceable from said predetermined sealing position when said predetermined operating pressure is

exceeded, and passage means defining a flow path around said seal when said predetermined operating pressure is exceeded



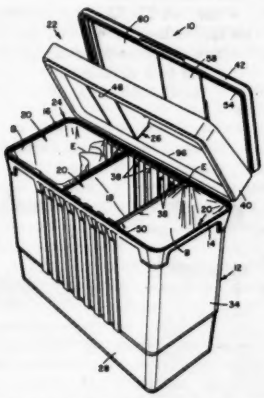
and when said sections are displaced from said predetermined sealing position. Said passage means comprising a plurality of notches in a wall forming said seal-receiving cavity.

5,072,852

RECEPTACLE WITH IMPROVED FEATURES FOR FACILITATING SEPARATING OF RECYCLABLE TRASH

Donald D. Smith, 257 10th St., and Betty J. Winfrey, 202 Vine, both of Burlington, Colo. 80807

Filed Sep. 18, 1990, Ser. No. 584,169
Int. Cl.[5] B65D *25/16*
U.S. Cl. 220—404 **8 Claims**



1. A receptacle for facilitating separating of recyclable trash, comprising:

(a) a container body having an open top and an interior storage cavity;

(b) a two-stage bi-level lid and bag retainer assembly hingedly mounted on said container body, said bi-level assembly having a lower annular bag retainer member and an upper cover member;

(c) said lower bag retainer member being hinged to said open top of said container body for movement between an engaged position for securing an open top edge of a flexible bag on said open top of said container body with the bag extending into said storage cavity and a released position for installing and removing of the flexible bag to and from said storage cavity;

(d) said upper cover member being hinged to said lower bag retainer member for movement between an opened position for permitting access too said storage cavity and the flexible bag therein and a closed position for preventing access to said storage cavity; and

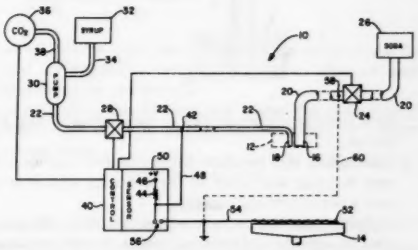
(e) an arrangement for retaining the open top edge of the flexible bag on said open top of said container body when said lower annular bag retainer member is moved to said released position from said engaged position, said bag retaining arrangement including a recessed track formed about said open top of said container body and a flexible gripping strip inserted within and running along said recessed track and being configured to receive and grip the open top edge of the flexible bag.

5,072,853

APPARATUS AND TECHNIQUE FOR SETTING BRIX IN A SOFT DRINK DISPENSER

Joseph W. Shannon, Kent, Ohio, assignor to ABCC/TechCorp, Akron, Ohio

Filed Jul. 27, 1990, Ser. No. 558,527
Int. Cl.[5] G01F *11/00*
U.S. Cl. 222—1 **19 Claims**



1. Apparatus for setting the brix of a soft drink dispenser, comprising:

a source of syrup;

a dispensing head receiving and dispensing syrup from said source of syrup;

a valve interposed between said source of syrup and said dispensing head, said valve enabling and inhibiting said dispensing of syrup;

sensing means operatively connected to said dispensing head for sensing and determining an actual rate of flow of said syrup from said dispensing head wherein a first portion of said sensing means is positioned beneath said dispensing head by a known distance, said syrup dispensed from said dispensing head contacting said first portion; and control means operatively interconnected between said sensing means and said source of syrup for adjusting said actual flow rate to attain a desired flow rate.

5,072,854

METHOD FOR TRANSPORTING A CURED ORGANIC OR ORGANOSILOXANE GEL

Randolph G. Niemi, and Michael R. Strong, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

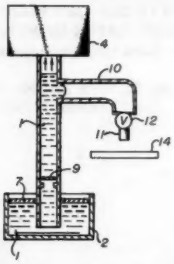
Filed May 18, 1990, Ser. No. 526,409
Int. Cl.[5] B67B *3/20*
U.S. Cl. 222—1 **9 Claims**

1. A method for transporting as an integral homogeneous unit at least part of a body of cured gel from a container through a conduit to at least one dispensing location, where said conduit comprises (a) an inlet section having a contour and a first orifice in continual contact with said body, (b) an outlet section forming a junction with said inlet section and having an second orifice at said dispensing location with control means at said location for controlling the flow of said gel from said second office, and (c) isolation means for isolating the portion of said inlet section containing said junction from said first orifice, where said isolation means is activated by positive

pressure applied within said conduit in the area of said junction, said method comprising the following sequence of steps:

1) immersing the first orifice of said inlet section in said body and maintaining the orifice at or below the surface thereof,

2) creating a pressure differential between a first portion of said body external to said first office and a second portion within said first orifice by applying superatmospheric pressure to the exposed surface of said first portion while creating a partial vacuum in said inlet section, said differential being from 50 to 500 p.s.i. and sufficient to cause said gel to enter and flow within said inlet section as a substantially integral homogeneous block of material having a contour corresponding to the contour of said inlet section,



3) maintaining said pressure differential for a period sufficient to cause said block to fill said inlet section and at least a portion of said junction,

4) applying a positive pressure within said inlet section sufficient to activate said isolation means, thereby separating said block from said body and causing said block to flow in the outlet section of said conduit and be transported to said dispensing location, and

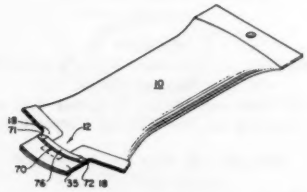
5) activating said control means to cause at least a portion of said gel to flow out of said conduit through said outlet orifice as an integral, homogeneous stream of material.

5,072,855

CURVED SEMI-RIGID PLASTIC RIB CLOSURE FOR FLEXIBLE CONTAINERS

Albert M. Herzig, 700 N. Rexford Dr., Beverly Hills, Calif. 90210

Filed Feb. 22, 1990, Ser. No. 483,249
Int. Cl.[5] B67D *5/32*
U.S. Cl. 222—39 **10 Claims**



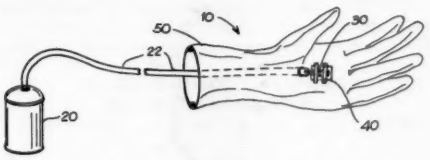
1. A curved resilient rib means having end fastening means for securing it to the side edges of a flat mouth of a flexible container, said rib means being constructed and arranged with less resistance to reverse flexure than the resistance to stretching of the mouth of the container, whereby squeezing force applied to a container having fluid entrapped therein causes the mouth of the container to reverse the rib curvature for opening the container in a manner to carry with it the ends of the rib towards a reverse bending of the rib from a concave towards a convex shape, wherein the changed curvature of the rib means results in a sudden audible "click" action.

5,072,856

TOY WEB-SHOOTING GLOVE

Stephen E. Kimble, 2607 N. Wilson Ave., Tucson, Ariz. 85719

Filed May 25, 1990, Ser. No. 528,419
Int. Cl.[5] B67D *5/64*
U.S. Cl. 222—78 **20 Claims**



1. A toy glove for shooting string foam, comprising:

(a) a pressurized assembly for storing, transporting and delivering a foam suspension, consisting of a canister attached to a delivery line with terminal valve means for releasing said suspension in the form of string foam;

(b) a glove; and

(c) a holder incorporated into the palm of said glove for housing and actuating said valve means by the action of the fingers of the hand wearing said glove;

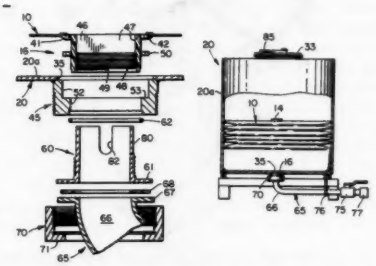
said pressurized assembly and said glove constituting two separable units to permit the replacement of the pressurized assembly upon exhaustion of the foam suspension.

5,072,857

BULK MATERIAL CONTAINER WITH FLEXIBLE LINER

Clarence B. Coleman, Oakland, Calif., assignor to Fabricated Metals, Inc., San Leandro, Calif.

Continuation of Ser. No. 251,326, Sep. 30, 1988, Pat. No. 4,960,227. This application Jun. 4, 1990, Ser. No. 533,098
The portion of the term of this patent subsequent to Oct. 2, 2007, has been disclaimed.
Int. Cl.[5] B65D *35/22*
U.S. Cl. 222—94 **2 Claims**



1. A bulk material container comprising:

(a) a shell having an opening at the bottom thereof, said shell having a bottom wall surrounding said opening in the bottom thereof;

(b) a discharge fitting secured to said shell below the opening thereof;

(c) a flexible liner disposed in said shell for containing bulk material, said flexible liner comprising an internally threaded bottom outlet fitting;

(d) an externally threaded sleeve disposed in threaded engagement with said threaded bottom outlet fitting, said threaded sleeve comprising a flange disposed below said discharge fitting; and

(e) a ring seal disposed between said discharge fitting, said bottom outlet fitting and said flange of said sleeve, the movement of said sleeve in threaded engagement with said bottom outlet fitting urges said ring seal into sealing

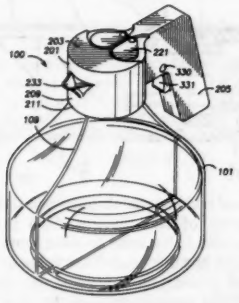
engagement between said sleeve, said bottom outlet fitting and said discharge fitting.

5,072,858

DIVIDED BEVERAGE SERVER

James W. Brashier, 1654 Creekside, Sugar Land, Tex. 77478

Filed Jan. 4, 1991, Ser. No. 638,476
Int. Cl.[5] A47G *19/12*; B65D *5/60*
U.S. Cl. 222—144.5 **4 Claims**



1. A divided beverage server, comprising:

a fluid container having an open upper end and first and second fluid storage chambers isolated from one another and having first and second fluid passage means, respectively, open to said open upper end;

cap assembly means mounted on said open upper end of said fluid container for closing said open upper end, said cap assembly means having first and second fluid passage bores communicating said first and second fluid passage means, respectively, of said fluid container to the outside of said cap assembly means, said first and second fluid passage means communicating fluids to said first and second fluid passage bores when said fluid container is tilted, and having a common pour spout having first and second fluid dispensing aperture means in communication with said first and second fluid passage bores, respectively, of said cap assembly means for communicating fluids stored in said chambers to said common pour spout from said first and second fluid passage bores when said fluid container is tilted; and

fluid storage chamber selection means housed within said cap assembly for selectively alternately closing said first fluid dispensing means and opening said second fluid dispensing means, or opening said first fluid dispensing means and closing said second fluid dispensing means, said fluid dispensing means when closed preventing fluid communication between the respective chamber and said common pour spout and said fluid dispensing means when open permitting fluid communication between the respective chamber and said common pour spout.

5,072,859

BEVERAGE DISPENSING SYSTEM WITH CLEAR DRINK PURGE AND METHOD

Ronald L. Wiley, Marietta, Ga.; Benjamin D. Miller, Chicago, Ill., and Phillip B. Groover, Woodstock, Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 316,364, Feb. 27, 1989, Pat. No. 4,967,932. This application May 18, 1990, Ser. No. 525,518
Int. Cl.[5] B67D *1/08*
U.S. Cl. 222—148 **10 Claims**

1. Apparatus comprising:

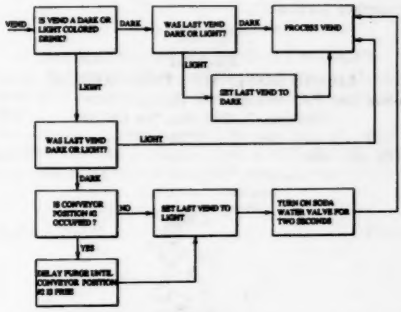
(a) an automatic beverage dispenser;

(b) said dispenser including an automatic multiflavor beverage dispensing valve including a solenoid controlled water valve and a solenoid controlled syrup valve;

(c) a syrup line in said dispenser connected to said beverage dispensing valve;

(d) a water line in said dispenser connected to said beverage dispensing valve;

(e) flushing means for opening said water valve for a selected



period of time while leaving said syrup valve closed to flush the dispensing valve with water to eliminate any previous syrup residue; and

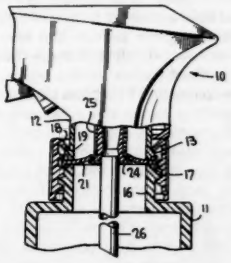
(f) said flushing means including means for determining whether the drink to be dispensed is a dark or a light colored drink.

5,072,860

ANTI-LOOSENING SNAP-FIT CAP FOR DISPENSER

Douglas B. Dobbs, Yorba Linda; Richard P. Grogan, Downey, and Elio Hernandez, W. Covina, all of Calif., assignors to Calmar Inc., Watchung, N.J.

Filed Mar. 28, 1990, Ser. No. 500,126
Int. Cl.[5] B67D *5/40*
U.S. Cl. 222—383 **4 Claims**



1. A dispenser having an anti-loosening snap-fit closure cap mounted on a container of product to be dispensed, comprising, a dispenser body having a cylindrical attaching portion, an external flange on said portion having an upper annular wall, a freely rotatable, internally threaded closure cap having a flexible conical skirt at one end in snap-fitting engagement with said flange for positively retaining said cap on said dispenser, the container having an externally threaded neck in threaded engagement with said cap, said attaching portion having a lower edge wall overlying an upper edge wall of said container neck, said skirt having a terminal edge wall in tight engagement with said upper annular wall upon tightening said cap onto said container neck, said lower edge wall comprising an inner annular sealing surface portion and an outer annular portion containing ratchet teeth, said upper edge wall comprising an inner annular sealing surface portion and an outer annular portion containing ratchet teeth, a gasket disposed between said lower and upper edge walls, said gasket having opposed smooth surfaces respectively in sealing engagement with said

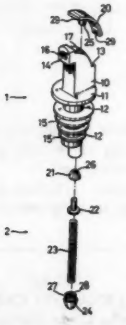
inner surface portions, said gasket further having opposed portions containing ratchet teeth respectively in engagement with said ratchet teeth of said outer portions of said lower and upper edge walls for resisting rotation of said body relative to said container about a central axis of said attaching portion to avoid any loosening of said tightened cap from said neck and to maintain the sealing engagement between said gasket and said inner surface portions.

5,072,861

LIQUID DISPENSING CONTROLLER

Wen-San Jou, P.O. Box 82-144, Taipei, Taiwan

Filed Jan. 7, 1991, Ser. No. 637,669
Int. Cl.[5] B67D *3/00*
U.S. Cl. 222—481 **1 Claim**



1. A liquid dispensing controller comprising:

a controlling unit composed of a guide portion, a base and a body portion, said guide portion being provided at the top with a curved groove and at the front with a hook member, said body portion being provided with a plurality of annular flanges in which the upper one is larger than the lower one in diameter, said controlling unit being formed with a liquid hole and an air hole, said liquid hole extending through said guide portion and said hook member while said air hole extending through the curved groove to form an inclined surface; and

a press device constituted by a press plate, a stop member, a T-shaped guide, a spring and a cap and fitted in the air hole of said controlling unit, said press device being provided at the bottom with a tubular member and a protuberance for limiting maximum down stroke of the press device, said stop member being formed with a hole through which the T-shaped guide may pass to engage with the tubular member of said press plate, said cap being provided with a projecting portion at the upper end, a recess for receiving spring and a center through hole.

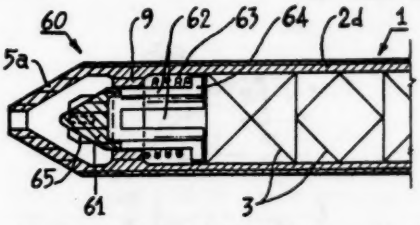
5,072,862

FLOW MIXER

Wilhelm A. Keller, Riedstrasse 1, CH-6330 Cham, Switzerland

Continuation of Ser. No. 189,549, May 3, 1988, abandoned. This application Apr. 16, 1990, Ser. No. 512,068
Claims priority, application Switzerland, May 6, 1987, 01729/87
Int. Cl.[5] B65D *5/72*
U.S. Cl. 222—496 **6 Claims**

1. In a flow mixer for attachment to a dispensing cartridge for liquid or pasty media, said mixer being of the type having mixing elements strung together lengthwise in a mixer tube, the improvement comprising that the mixer contains at least parts of a check valve arranged in series with the mixing elements, said value including a valve body acted upon directly by the material to be mixed and having a predetermined opening pressure, the mixer has an outlet orifice and said check valve parts are arranged at the outlet orifice of the mixer contiguous to the mixing elements, said valve body being tapered and having slots for flow therethrough toward said outlet orifice of said material to be mixed, said mixer including a guide on its inner surface, said guide having means downstream of said slots for engaging said valve body and blocking flow of said material toward the outlet orifice in a first position of said valve body, and in a second position of said valve body



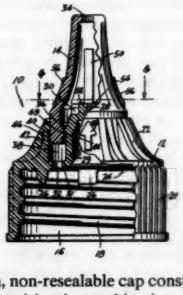
permitting flow of said material through said slots to said outlet orifice, application of said predetermined pressure to said material causing said valve body to move from said first position to said second position, said check valve including biasing means operating to instantly move said slide body from said second to said first position to stop the flow of the mixed material from said mixer when the expelling force applied to said dispensing cartridge ceases.

5,072,863

PUSH-TO-OPEN NON-RESEALABLE CAP CONSTRUCTION

Gene Stull, 1086 Hacklebarney Rd., Chester Township, Morris County, N.J. 07930

Filed Mar. 21, 1990, Ser. No. 496,937
Int. Cl.[5] B67D *3/00*
U.S. Cl. 222—523 **24 Claims**



1. A push-to-open, non-resealable cap construction for handheld dispensers, comprising in combination:

a) a body member having a discharge passage,

b) a nozzle member carried by the body member and being axially shiftable thereon between a raised, sealing position and a lowered, discharge position, said nozzle member having a discharge orifice,

c) cooperable valving means on said members for interrupting communication between the discharge passage and the discharge orifice when the nozzle member is disposed in its raised, sealing position, and for establishing communication between the discharge passage and the discharge orifice when the nozzle member is disposed in its lowered, discharging position such that product can flow through the discharge passage and valving means and out through the discharge orifice of the nozzle member, and

d) cooperable yieldable detent means on said body member and nozzle member, for maintaining said nozzle member in the raised, sealing position in the absence of an external

axial force applied to the nozzle member, said yieldable detent means yielding under the application of an axial force applied to the nozzle member to enable the nozzle member to be shifted from its raised, sealing position to its lowered, discharge position, said yieldable detent means thereafter serving to retain said nozzle member in said lowered, discharge position once it has arrived there.

5,072,864

CARBON-CONTAINING WEARABLE REFRACTORY PARTS

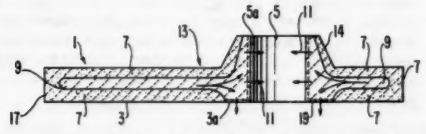
Ernst Lührsen, Bad Schwalbach; Andreas Schuler, Taunusstein-Wehen, and Ullrich Hintzen, Taunusstein-Watzhahn, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Sep. 14, 1990, Ser. No. 582,612

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1989, 3930866

Int. Cl.[5] B22D *41/32*

U.S. Cl. 222—600 **21 Claims**



1. An element formed of a carbon-containing refractory material, having an exposed surface which is subject to thermo-chemical attack in ambient air, said exposed surface having a protective layer formed of a boron-based impregnating agent impregnated in said refractory materizl, said element further including at least one wearable surface subject to wear due to contact with a wear inducing substance, said at least one wearable surface having thereon a film means for preventing impregnation by said boron-based impregnating agent, and wherein portions of said refractory material other than said protective layer are impregnated with a wear reducing substance comprising tar.

5,072,865

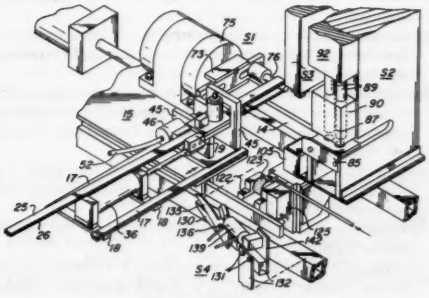
APPARATUS FOR MAKING DECORATIVE BOWS

Jeffrey Lyons, Aldan, Pa., assignor to Delaware Ribbon Manufacturers, Inc., Philadelphia, Pa.

Filed Mar. 28, 1990, Ser. No. 500,580

Int. Cl.[5] A41H *43/00*; D04D *7/06*

U.S. Cl. 223—46 **2 Claims**



1. Apparatus for making decorative bows of ribbon from an endless supply of ribbon which comprises

a feeding and wrapping station for feeding ribbon and wrapping it into multiple loops,

a punching station to remove a portion of the ribbon,

a trimming station to trim the punched ribbon to length forming at least one integral tail,

a stapling station to receive said punched ribbon and a strip of backing paper and to apply a staple through said paper and around said punched ribbon forming the desired bow having at least one integral tail.

5,072,866

PLURAL GARMENT SUPPORT HANGER

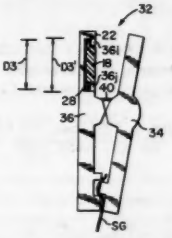
Chester Kolton, Westfield, and Stuart S. Spater, Livingston, both of N.J., assignors to B & G Plastics, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 234,212, Aug. 18, 1988, Pat. No. 4,884,726. This application Jun. 8, 1989, Ser. No. 362,941

The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.[5] A47G *25/48, 25/14*

U.S. Cl. 223—91 **13 Claims**



1. In combination, for the hanging of plural garments;

(a) a hanger comprised of an integral body of synthetic material having a body portion for hanging a first garment, said body portion having a central opening and a hook portion extending outwardly of said body portion and a cross-member bounding said central opening;

(b) clip means for securement to said cross-member and for releasably receiving a second garment, said clip means including

(1) first and second members each having a mid-portion and first and second end portions extending oppositely from said mid-portion, said first end portion of said first member defining detent means for engagement with said cross-member to secure said clip means thereto, said second end portions of said first and second members being adapted for retentive engagement with said second garment, and

(2) means for joinder with said first and second members for assembly of said clip means, said joinder means applying bias to said first and second members to effect mutual rotation thereof about said mid-portions to be in biased engagement with one another, said cross-member being configured in part for effecting such securement of said clip means thereto and in other part for facilitating release of said clip means therefrom when desired.

5,072,867

GOLF BAG CARRIER AND METHOD THEREFOR

Ron P. Zingale, 8071 E. Del Tornasol, Scottsdale, Ariz. 85258

Filed May 15, 1990, Ser. No. 523,660

Int. Cl.[5] B65H *75/40*

U.S. Cl. 224—162 **8 Claims**

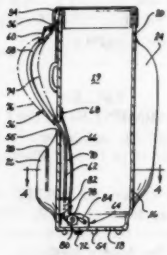
1. A golf bag carrier comprising:

a bag subassembly having a peripheral wall and a bottom wall and an open top wall portion enclosing a cavity;

the peripheral wall having a slotted hole;

a strap subassembly having an elongate strap which passes through the slotted hole separating a top exterior strap end from a bottom interior strap end and having a roll-up

retractor unit mounted in the cavity adjacent to the bottom wall;



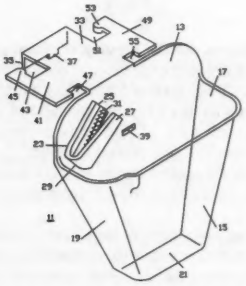
the top exterior strap's end being fixedly connected to the top wall portion and the bottom interior strap being fixedly connected to the retractor unit.

5,072,868

PORTABLE WET PAINT BRUSH HOLDER

Robert G. Dickie, Ontario, and Christopher A. Smith, Toronto, both of Canada, assignors to Brushmate Corporation, Toronto, Canada

Filed Jan. 4, 1991, Ser. No. 637,417
Int. Cl.[5] A45F *5/00*
U.S. Cl. 224—252 **18 Claims**



1. A portable holder for a wet paint brush, said holder comprising a substantially rectangular bottom panel, vertical opposing front and rear walls, and substantially rectangular opposing side walls forming an enclosure with a top opening for receiving the brush portion of a conventional paint brush having its handle extending in an upward direction, characterized in that:

one of said side walls is substantially vertical and the other of said side walls is outwardly inclined from the vertical at the bottom by an acute angle so that said enclosure top opening is larger than said bottom portion and

a flexible clip is mounted on said rear wall adjacent to the angled side wall and the top of said rear wall for holding the paint brush handle,

the jaws of said clip extending at a substantially right angle with respect to the inclined one of said side walls.

5,072,869

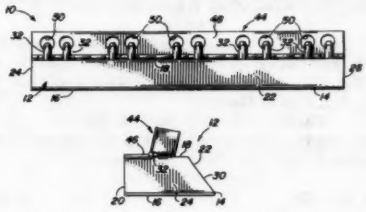
COMPUTER PAPER TAB STRIPPER

Richard M. Padgett, 6130 Whitsett Ave., North Hollywood, Calif. 91606

Filed Jan. 7, 1991, Ser. No. 637,737
Int. Cl.[5] B26F *3/02*
U.S. Cl. 225—106 **9 Claims**

1. An improved paper tab stripper, said stripper comprising, in combination:

a) an elongated block having a flat bottom, a flat top spaced from said bottom and interconnecting opposite sidewalls and endwalls, one of said two sidewalls being sloped to provide an inclined ramp between said top and said bottom, said block having a plurality of straight pins spaced along the length thereof and protruding upwardly from said top, said pins having a lower portion of a substantially constant cross-sectional area of substantially the same size as the holes in the computer paper tab and further having an upper portion formed into a truncated cone; and,



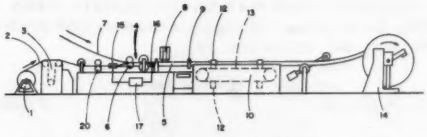
b) an elongated solid lid hinged to said top along substantially the length of said top and having a plurality of recesses significantly greater than the cross-sectional area of said pins which are spaced along the length thereof and registrable with said pins, said lid being rotatable between a lid-up position away from said pins and a lid-down position wherein said pins are in said recesses.

5,072,870

METHOD AND APAPRATUS FOR FORMING METALLIC SHEATHS ABOUT OPTICAL CONDUCTOR ELEMENTS

Gerhard Ziemek, Langenhagen, Fed. Rep. of Germany, assignor to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 29, 1990, Ser. No. 619,521
Claims priority, application Fed. Rep. of Germany, Feb. 5, 1990, 4003311
Int. Cl.[5] B23K *9/00;* **B21D** *39/04*
U.S. Cl. 228—102 **3 Claims**



1. Method of forming a metallic sheath about a conductor element comprised of a plurality of optical fibers, comprising the steps of:

continuously drawing a metallic strip in a longitudinal direction through a forming means to form a hollow tubular member;

heating a portion of the continuously drawn, metallic strip as it enters a front end of said forming means for temporarily lengthening the metallic strip as it is formed into the hollow tubular member;

continuously drawing a conductor element comprised of a plurality of optical fibers in a longitudinal direction into the front end of said forming means;

continuously welding longitudinally edges of the hollow tubular member;

continuously sensing the temperature of a surface of the hollow tubular member as it passes from said forming means; and

continuously adjusting the heating of the continuously drawn metallic strip in response to the sensed temperature of the hollow tubular member for maintaining a temporary lengthening of the metallic strip,

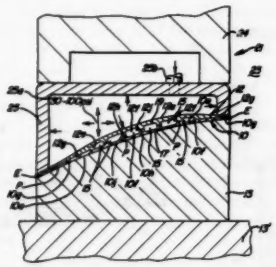
wherein the absolute length of conductor element is rendered greater than that of the encompassing, welded tubular member.

5,072,871

METHOD OF MAKING HOLLOW ARTICLES

Donald J. Moracz, Garfield Heights, and Roch J. Shipley, Mentor, both of Ohio, assignors to Compressor Components Textron Inc., Lima, Ohio

Filed Jun. 27, 1990, Ser. No. 543,967
Int. Cl.[5] B23K *20/00*; B21K *3/04*
U.S. Cl. 228—193 **21 Claims**



1. A method of making a hollow article from first and second preformed sections, each section having spaced apart bonding surfaces and a wall intermediate the bonding surfaces, comprising the steps of:

(a) assembling the first and second sections in such a manner that the bonding surfaces of the sections are opposing and the intermediate walls of the sections define a cavity therebetween,

(b) forming a substantially fluid impermeable precursor diffusion bond between the opposing bonding surfaces by subjecting the assembled sections to pressure-temperature-time conditions where (1) a first external pressure is so applied to the first section with the cavity evacuated as to reduce any gaps between the opposing bonding surfaces and (2) a second external pressure less than the first external pressure is so applied to the first section with the cavity evacuated as to form a substantially fluid impermeable precursor diffusion bond between the opposing bonding surfaces,

(c) subjecting the sections to pressure-temperature-time conditions where a third external pressure greater than the second external pressure is so applied to the first section and an internal pressure of substantially the same magnitude as said third external pressure is so applied to the cavity as to diffusion bond the bonding surfaces, and

(d) subjecting the sections to pressure-temperature-time conditions where an internal pressure is so applied to the cavity with the intermediate wall of the first section positioned relative to a rigid external shaping surface as to shape the intermediate wall to the shaping surface to remove any inward distortion of the intermediate wall resulting from step (b).

5,072,872

DEVICE FOR TRANSPORTING MATERIALS IN STRIP, SHEET, OR FILAMENT FORM

Jacques Casset, Sallanches, and Gerard Lavorel, Pringy, both of France, assignors to A2C Groupe Pratic-Ademva, France

Filed Feb. 15, 1990, Ser. No. 480,604
Claims priority, application France, Feb. 15, 1989, 89 02207
Int. Cl.[5] B65H *20/00*
U.S. Cl. 226—176 **6 Claims**

1. A device for transporting material in continuous form, comprising:

a body;

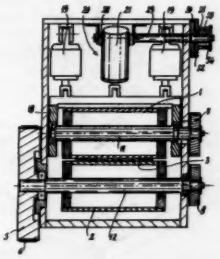
a pair of parallel drive rolls rotatably mounted on the body for receiving said material therebetween;

means for driving the drive rolls in opposite directions;

a chassis, one of said drive rolls being mounted on the chassis;

means pivotally mounting the chassis on the body for movement about an axis parallel to the axes of rotation of the drive rolls, whereby said one drive roll is movable transversely with respect to the other drive roll;

a double-acting jack;



means for connecting the jack to the chassis, whereby said jack forces the chassis to pivot in two directions such that said one roll is caused to move transversely with respect to the other roll; and

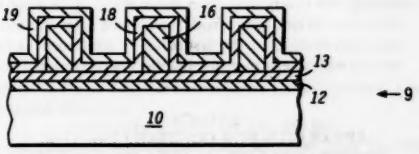
adjustable stop means mounted on the chassis for limiting movement of the chassis in the pressing direction in opposition to action of the jack, adjusting the distance between the rolls independent of the action of the jack and enabling the chassis to move and also limiting movement of the chassis in a direction to allow the drive rolls to move apart, thereby releasing continuous material disposed between the rolls.

5,072,873

DEVICE FOR SOLDER REMOVAL

Jay J. Liu, Chandler; Thomas A. Scharr, Mesa, and William H. Lytle, Chandler, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 3, 1990, Ser. No. 518,615
Int. Cl.[5] B23K *1/018*
U.S. Cl. 228—264 **18 Claims**



1. A device for solder removal comprising:

a supporting base comprised of a semiconductor material; and

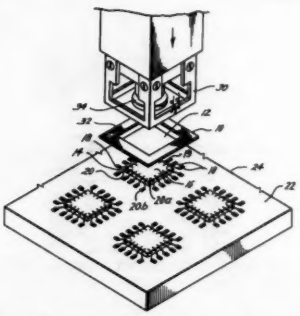
a plurality of columnar structures disposed on one side of the supporting base, the plurality of columnar structures being comprised of a solderable metal.

5,072,874

METHOD AND APPARATUS FOR USING DESOLDERING MATERIAL

Michael J. Bertram; Daniel M. Andrews, and Thomas A. Bishop, all of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Jan. 31, 1991, Ser. No. 648,266
Int. Cl.[5] B23K 3/00
U.S. Cl. 228—264 40 Claims



1. A method for desoldering an electronic component, comprising:

positioning a desoldering material above an electronic component disposed on a surface, wherein

the electronic component comprises a base and a plurality of electrically conductive metal outer leads, the outer leads comprise first ends attached to the base and second ends extending beyond the outer periphery of the base and soldered at solder joints to pads on the surface,

a first adhesive is positioned between the base and the surface to secure the base to the surface, and

the desoldering material can absorb molten solder and comprises an opening shaped to receive the base of the electronic component;

positioning the base inside the opening so that the desoldering material contacts each solder joint without contacting the base;

heating the solder joints to at least the melting point of the solder to render the solder in the solder joints molten;

flowing molten solder from the contacted solder joints into the desoldering material to simultaneously desolder the solder joints;

providing a retraction device above the base;

positioning a second adhesive between the base and the retraction device to secure the base to the retraction device;

heating the first adhesive to soften the first adhesive so that the adhesive strength of the first adhesive is less than the adhesive strength of the second adhesive;

removing the desoldering material from the surface after the solder joints are desoldered; and

removing the component from the surface by moving the retraction device away from the surface after the solder joints are desoldered, the first adhesive is softened, and the second adhesive secures the base to the retraction device.

5,072,875

APPARATUS FOR CONTROLLING THE TEMPERATURE OF AN AREA OF THE BODY

Thomas N. Zacoi, Pittsburgh, Pa., assignor to Federal Leasing Rehab Company, Pittsburgh, Pa.

Filed Mar. 15, 1990, Ser. No. 493,932
Int. Cl.[5] A61F 7/00
U.S. Cl. 128—400 20 Claims

1. Apparatus for use with a temperature controlled fluid circulating device, said apparatus for controlling a temperature of an area of a body, said apparatus comprising:

a fluid circulating blanket;

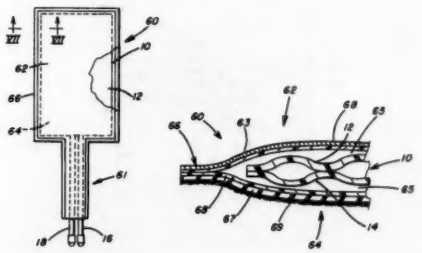
said fluid circulating blanket having a first side and a second side;

said fluid circulating blanket having fluid connection hose means extending from one edge thereof;

said fluid connection hose means including an extended end adapted to be connected to the fluid circulating device;

a support envelope surrounding said fluid circulating blanket to enclose at least said first side and said second side within an interior of said support envelope;

said support envelope including a waterproof inside surface



adjacent said first side and a waterproof outside surface adjacent said second side of said fluid circulating blanket;

said waterproof inside surface having means for preventing a passage of fluid therethrough and having outwardly disposed material for placement against the area of the body;

said waterproof outside surface having means for preventing a passage of fluid therethrough and including insulation material; and

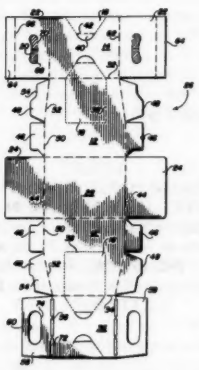
said waterproof outside surface and said waterproof inside surface of said support envelope being sealed at peripheral edges thereof to cause said support envelope to be capable of collecting fluid within said interior of said support envelope.

5,072,876

ARTICLE CARRIER WITH SIDE HANDLES

Jerry F. Wilson, Downsville, La., assignor to Riverwood International Corporation, Denver, Colo.

Filed Oct. 30, 1990, Ser. No. 605,610
Int. Cl.[5] B65D 5/02
U.S. Cl. 229—40 5 Claims



1. A blank for forming an article carrier, comprising:

a central bottom panel section having side edges and end edges;

intermediate side panel sections connected to the side edges of the bottom panel section along score lines, each side panel section having side and end edges;

a first top panel section connected to the side edge of one of the side panel sections along a score line and a second top panel section connected to the side edge of the other side panel section along a score line, the first top panel section adapted to overlie the second top panel section in a carrier formed from the blank, the top panel sections having end edges;

first end panel flaps connected to the end edges of the first top panel section along score lines, each first end panel flap containing a handle opening therein;

second end panel flaps connected to the end edges of either the second top panel section or the intermediate side panel sections along score lines, the second end panel flaps containing a handle opening therein; and

third end panel flaps connected to the end edges of the central bottom panel section;

the first end panel flaps being adapted to overlie the second end panel flaps and to overlap the third end panel flaps in a carrier formed from the blank so that the handle openings in the first end panel flaps overlie the handle openings in the second end panel flaps to enable a user to grasp the first and second handle openings in each end panel to lift the carrier.

5,072,877

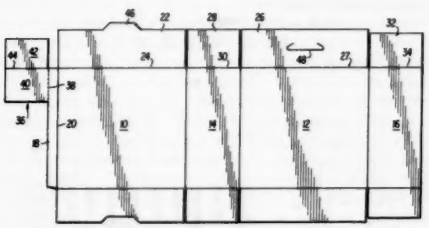
CARTON INCLUDING DETACHABLE COUPON

Lisa Van Fulpen, Galesburg, Mich., assignor to Kellogg Company, Battle Creek, Mich.

Filed Oct. 29, 1990, Ser. No. 604,157

Int. Cl.[5] B65D *5/10*

U.S. Cl. 229—155 **10 Claims**



1. A carton comprising:

(a) a front panel;

(b) a back panel;

(c) a first side panel;

(d) a second side panel;

(e) a glue tab hingedly connected to one of said panels along a first hinge line and glued to the inner surface of the adjacent one of said panels;

(f) said front panel, said back panel, and said first and second side panels together forming an at least generally rectangular parallelpipepedal box with a top opening;

(g) a first major flap hingedly connected to said front panel along a second hinge line and extending into said top opening;

(h) a second major flap hingedly connected to said back panel along a third hinge line and extending into said top opening;

(i) at least one minor flap hingedly connected to said first side panel along a fourth hinge line and extending into said top opening; and

(j) a redeemable commercial information panel hingedly connected to said glue tab by a tear line, said redeemable commercial information panel comprising:

(i) a first segment that is hingedly connected to said glue tab by said tear line and that makes planar abutting contact with said adjacent one of said panels and

(ii) a second segment that is hingedly connected to said first segment along a sixth hinge line and that makes planar abutting contact with the inner surface of one of said flaps.

5,072,878

AIR CONDITIONING APPARATUS

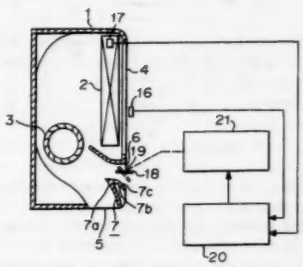
Katsuyuki Aoki; Hideaki Nagatomo; Seiji Kubo; Hiroyuki Umemura; Toshihiro Tanaka; Kazuaki Isono, and Hidenori Ishioka, all of Shizuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1990, Ser. No. 497,698

Claims priority, application Japan, Jul. 31, 1989, 1-89918[U]

Int. Cl.[5] F24F *11/04*

U.S. Cl. 236—38 **12 Claims**



1. An air conditioning apparatus for heating air in a space having an upper portion and a lower portion, the space being lined by a floor, a ceiling and at least one side wall at which the apparatus is positioned, the apparatus comprising:

a heat exchanger for exchanging heat with air of the space to form conditioned air,

a plurality of outlet ports for issuing conditioned air to the space,

a blowing fan for blowing conditioned air from the outlet ports to the space,

an air directing plate arranged at at least one of the outlet ports to control flow from the plurality of outlet ports to one of the floor, and the upper and lower portions of the space,

an operation state detecting means for detecting an operating state of the apparatus to determine a heating load of the apparatus,

control means for determining the heating load from the detected operating state and for comparing the heating load with a reference value, and

a driving means for adjusting the position of the air directing plate, depending on signals from the control means,

wherein flow of conditioned air to the floor, and the upper and lower portions of the space is controlled by the comparison between the heating load of the apparatus and the reference value.

5,072,879

HEATING SYSTEM CONTROL

Michael E. Noye, 118 Hill House Road, Stone, Dartford, Kent, England DA2 6EX

Filed May 8, 1989, Ser. No. 348,960

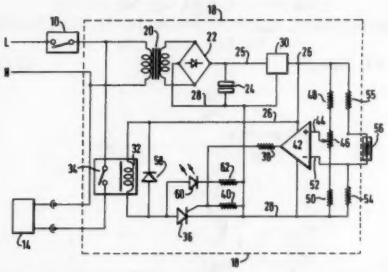
Claims priority, application United Kingdom, May 11, 1988, 8871186

Int. Cl.[5] F24D *3/00*

U.S. Cl. 237—8 R **16 Claims**

1. Apparatus for controlling operation of a heating system, which system includes a boiler directly heating and passing water to a pipe network of the system and comprising means

for sensing the temperature of water in said pipe network at one or more positions remote from the boiler and switch means responsive to the output of said temperature sensing means, which switch means is operable to permit energisation of the boiler until the output of the temperature sensing means indicates that a temperature being monitored has reached a first temperature level and thereafter prevent energisation of the boiler until the output of said temperature sensing means indicates that the said temperature being monitored has fallen below a second temperature level less than the first temperature level, wherein said temperature sensing means is arranged to generate a first voltage output whenever said monitored temperature reaches or exceeds said first temperature level and



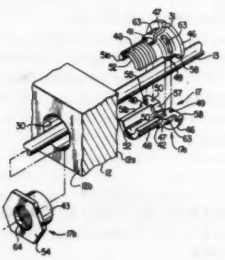
a second voltage output whilst the first said monitored temperature is less than said second temperature level, wherein means are provided enabling said first and second voltage outputs to be varied in equal amounts in dependence upon the ambient temperature of an area remote from the area being heated by the central heating system, wherein said switch means includes semiconductor switch means controlling operation of a further switch which, when closed, connects a fuel control valve for the boiler to a power supply therefor and which, when open, disconnects said power supply and said fuel control valve, the apparatus further including a light emitting diode arranged in the semiconductor switch means to be illuminated when that switch means is operable to disable operation of the boiler so as to provide an indication thereof.

5,072,880

SECTIONAL ROD BEARING FOR FUSSBALL GAME STRUCTURE

Calvin E. McCloud, 4959 Rendon Rd., Fort Worth, Tex. 76140

Filed Dec. 27, 1990, Ser. No. 634,392
Int. Cl.[5] A63F *7/06, 7/36*
U.S. Cl. 273—85 D **18 Claims**



7. An improved molded plastic bearing structure insertable into a side wall opening of a table soccer or fussball game structure and operative to slidably support an actuating rod, coaxially extending through said side wall opening, for axial and rotational movement relative to the side wall, said improved molded plastic bearing structure comprising:

first and second hollow cylindrical sections axially insertable into said side wall opening, from opposite sides thereof, and being threadingly engageable with one another, each of said sections having a body portion snugly receivable within said side wall opening, and an outer end flange abuttable with a side surface of the wall when said first and second sections are threadingly tightened to one another within said side wall opening,

said first section being formed from two separable radial halves which combinatively define, along an interior surface portion of said first section longitudinally adjacent said body portion and outer end flange thereof, an integral circular rod-engaging surface for slidably contacting and supporting a longitudinal portion of said actuating rod,

said outer end flange and body portion of said first section, due to molding distortion therein, being subjectable to unevenly distributed exterior surface wall contact forces when said first and second sections are operatively tightened together within said side wall opening; and

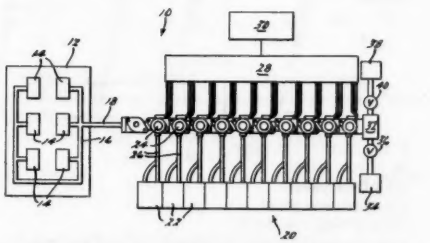
stress relieving means, formed on only a radially outer portion of said first section positioned radially outwardly of said circular rod-engaging surface, for isolating said circular rod-engaging surface from unevenly distributed wall contact forces to preserve the circularity of said rod-engaging surface and maintain it in a precisely concentric relationship with said side wall opening.

5,072,881

METHOD OF CLEANING AUTOMATED PAINT SPRAYING EQUIPMENT

Frank A. Taube, III, Troy, Mich., assignor to Systems Specialties, Ferndale, Mich.

Filed Jun. 4, 1990, Ser. No. 532,638
Int. Cl.[5] B05B *15/02*
U.S. Cl. 239—8 **4 Claims**



1. A method for cleaning the flow paths of an automated spray coating apparatus, said apparatus being adapted to apply different coatings in succession, said method comprising:

providing a pressurized source of a suitable cleaning solvent,

providing a supply of compressed gas,

simultaneously opening control valves to allow flow of said solvent and said compressed gas to a ratio mixing valve,

controlling the flow of said compressed gas relative to the flow of said solvent by means of said ratio mixing valve to maintain a substantially constant predetermined ratio therebetween without regard to variations in pressures of said compressed gas and said pressurized source of cleaning solvent,

intermixing said solvent and compressed gas in said predetermined ratio, and

passing said intermixed solvent and gas through said flow paths of said spray coating apparatus.

5,072,882

HIGH PRESSURE FUEL INJECTION DEVICE FOR ENGINE

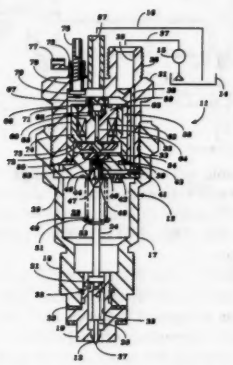
Jun Taue, and Takeo Yoshida, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Yamaha Motor Co., Ltd., Iwata, Japan

Division of Ser. No. 318,674, Mar. 3, 1989, Pat. No. 4,993,636. This application Aug. 28, 1990, Ser. No. 573,844

Claims priority, application Japan, Mar. 4, 1988, 63-50955; Mar. 4, 1988, 63-50958

Int. Cl.[5] F02M *51/00*

U.S. Cl. 239—88 4 Claims



1. An accumulator type of injection nozzle comprised of an outer housing having a longitudinal axis defined by a threaded part for attachment to an engine and defining an accumulator chamber adapted to be supplied with high pressure fuel, a nozzle port leading from said accumulator chamber, an injector valve moveable between a closed position and an opened position for controlling the discharge of fuel from said accumulator chamber through said nozzle port, a control chamber for receiving pressurized fuel, an actuating member supported for movement within said control chamber and associated with said injector valve for retaining said injector valve in its closed position when said control chamber is pressurized and for movement of said injector valve to its opened when pressure is relieved in said control chamber, and relief valve means moveable between a closed position for maintaining pressure in said control chamber for effecting fuel discharge through said nozzle port, the improvement comprising a fuel inlet port in said outer housing for admitting fuel to said accumulator chamber and to said control chamber from a source and a return port for returning fuel to the source from the control chamber when said relief valve opened, both of said ports being formed in the end of said outer housing remote from the nozzle port and at least one of said ports extending in the same direction on said longitudinal axis.

5,072,883

FULL CONE SPRAY NOZZLE WITH EXTERNAL AIR ATOMIZATION

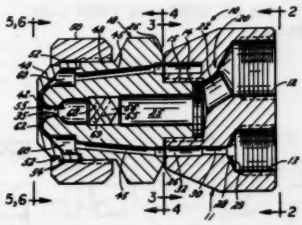
Daniel A. Vidusek, St. Charles, Ill., assignor to Spraying Systems Co., Wheaton, Ill.

Filed Apr. 3, 1990, Ser. No. 504,321

Int. Cl.[5] B05B *1/28, 7/10, 7/06, 1/34*

U.S. Cl. 239—290 8 Claims

1. A full cone air atomizing nozzle assembly comprising, in combination, a body, means defining a liquid passage in said body, means for connecting an upstream end of said liquid passage to a pressurized liquid supply, said liquid passage having an annular, outwardly diverging discharge orifice at a downstream end thereof for directing a discharging liquid flow stream in a generally conical pattern, vane means disposed within said liquid passage for imparting a swirling, turbulence to liquid prior to discharge from said discharge orifice so that the discharging liquid is in the form of a conical spray pattern with liquid particles distributed throughout the pattern, means for defining an air passage in said body, means for connecting said air passage to a pressurized air supply, an end cap mounted on a downstream end of said body, said end cap an downstream body end defining an annular air chamber in communication with said air passage, said end cap having an annular



opening and being internally configured for directing pressurized air generally transversely to the liquid flow stream discharging from said discharge orifice so that pressurized air surrounds and impinges the liquid flow stream subsequent to discharge from said discharge orifice to assist in atomization of the liquid while permitting the discharging flow stream to assume a conical spray pattern with liquid particles distributed throughout the pattern.

5,072,884

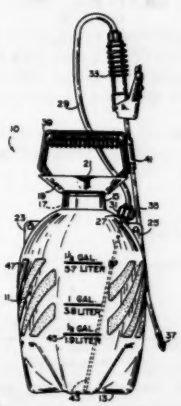
ELLIPTICAL TANK PORTABLE GARDEN SPRAYER

Garry L. Ellison, and Kim W. Sears, Middleville, both of Mich., assignors to Root-Lowell Corporation, Lowell, Mich.

Continuation of Ser. No. 392,718, Aug. 11, 1989, abandoned. This application Dec. 5, 1990, Ser. No. 622,376

Int. Cl.[5] B05B *9/04*

U.S. Cl. 239—373 24 Claims



1. A tank for a portable sprayer comprising:

a one-piece tank having an elliptical sidewall configuration extending substantially entirely from the bottom of said tank to the top of said tank;

an internally threaded inlet disposed on the top of said tank;

an externally threaded outlet disposed near the top of said tank; and

a plurality of spaced supporting surfaces formed on the bottom of said tank.

5,072,885

VALVE NEEDLE AND METHOD FOR PRODUCING A VALVE NEEDLE

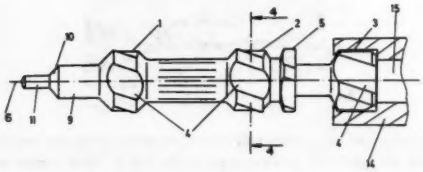
Waldemar Hans, Bamberg, and Guenther Bensch, Stein, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 13, 1990, Ser. No. 508,631

Claims priority, application Fed. Rep. of Germany, May 2, 1989, 3914486

Int. Cl.[5] B05B *1/34;* F02M *61/00*

U.S. Cl. 239—466 14 Claims



1. A method for producing a valve needle having helically disposed grooves, which comprises cutting a needle blank from a profile bar provided with axially aligned grooves extending in the direction of the longitudinal axis; twisting the needle blank to form helical grooves (4) along its length and then machining the twisted needle blank in a metal-cutting manner to form a final needle shape including at least one guide section (1, 2), a needle sealing face (10), and an armature head (3).

5,072,886

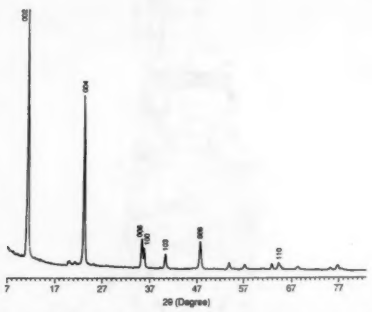
METHOD OF PREPARING A NEW ULTRA-FINE PARTICLE TRANSITION ALUMINA

S. Roy Morrison, Burnaby, and Bijan K. Miremadi, Coquitlam, both of Canada, assignors to Simon Fraser University, Burnaby

Continuation of Ser. No. 242,963, Sep. 9, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 449,492

Int. Cl.[5] B02C *19/12*

U.S. Cl. 241—1 12 Claims



1. A method of converting porous microscopic alumina particles into ultra-fine microscopic alumina particles, the method comprising:

(a) introducing an alkali metal into the pores of porous microscopic alumina particles; and

(b) immersing the alkali metal treated porous microscopic alumina particles in a water-containing liquid, thereby rapidly generating hydrogen in the pores of the porous microscopic alumina particles, and thereby fracturing the porous microscopic alumina particles into ultra-fine microscopic alumina particles.

5,072,887

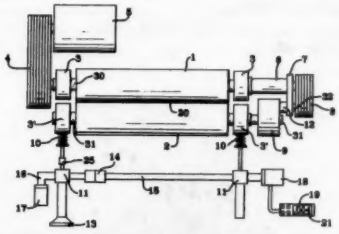
ROLL MILL

Kelsey C. Thom, Jr., Waterloo, Iowa, assignor to California Pellet Mill Company, San Francisco, Calif.

Filed Jan. 19, 1990, Ser. No. 467,701

Int. Cl.[5] B02C *4/32*

U.S. Cl. 241—37 9 Claims



1. An adjustable roll mill assembly comprising:

a pair of opposed rolls in longitudinal alignment including a primary roll and a dependent roll mounted in bearings permitting the adjustment of distance between the centerlines of said rolls;

means for adjusting the distance between said rolls;

a primary drive means for said primary roll;

a drive means interposed between said rolls to accomplish drive of said dependent roll including:

a gear box mounted for rotation on an end shaft of one of said opposed rolls having a first drive element in axial alignment with the centerline of one of said rolls and a second gear box drive element in fixed parallel offset axial alignment with said first drive element;

said second drive element being driven by said first drive element at a selected drive ratio;

drive means interposed between said second drive element and the other of said opposed rolls for transmitting drive between said second drive element and the other of said opposed rolls; and

said drive means including selectively adjustable means for establishing the distance between the centerline of said second drive element and said other of said opposed rolls and to prevent rotation of said gear box about said one drive roll.

5,072,888

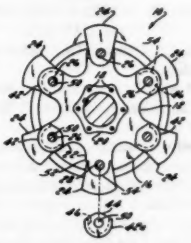
SYMMETRICAL PROTECTIVE CAP FOR A ROTARY HAMMER ASSEMBLY FOR A HAMMERMILL

John C. Stelk, Bettendorf, Iowa, assignor to Sivyer Steel Corporation, Bettendorf, Iowa

Filed Dec. 20, 1989, Ser. No. 453,622

Int. Cl.[5] B02C *13/28*

U.S. Cl. 241—194 8 Claims



1. For use in a rotary hammermill assembly having a plurality of spiders mounted adjacent each other on a drive shaft, each of the spiders having a number of radially extending arms,

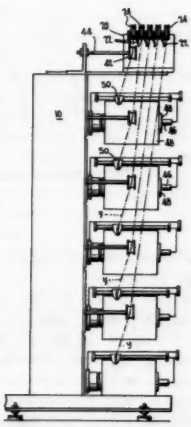
the arms of the spiders each having an outer surface terminating in a tip and being spaced from the arms of the adjacent spiders, a number of hammer shafts extending through the arms of the spiders and a number of hammers mounted on the hammer shafts between the spider arms, an end cap comprising a body portion adapted to be mounted on a hammer shaft to fill the space between the arms, and a circular flange adapted to overlie the adjacent tips of the spider arms to define a protective surface only for the outer surface and the tip of said spider arm and said hammer shaft whereby the tip of the spider arm and the space between the spider arms are protected from flying fragments of shredded metal.

5,072,889

TAKE-UP MECHANISM

Charles W. Brouwer, 4206 Tallwood Dr., Greensboro, N.C. 27410, and Larry C. Cowan, R.R. #1 - Box 112C, Hickory Grove, S.C. 29717

Filed Jun. 11, 1987, Ser. No. 60,482
Int. Cl.[5] B65H *54/20, 59/38*
U.S. Cl. 242—35.5 R **1 Claim**



1. A take-up mechanism for simultaneously winding a plurality of yarn strands on a plurality of take-up spindles comprising

(a) support unit;

(b) a plurality of yarn take-up spindles positioned in substantial vertical alignment on said support unit;

(c) drive means constructed and arranged with said plurality of take-up spindles for driving separately each of said plurality of take-up spindles, and

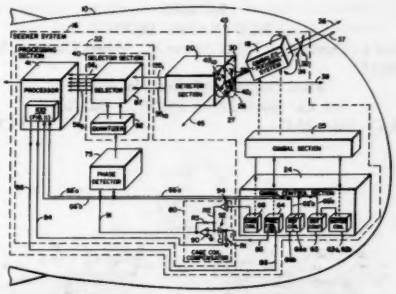
(d) a compensator arm assembly positioned above said spindles comprising a plurality of compensator arms pivotable around a common axis and each having a guide roll, said compensator arms of said compensator arm assembly being constructed and arranged to individually control the speed of said drive means for one of said take-up spindles, said plurality in each of said plurality of yarn strands, plurality of take-up spindles, plurality of compensator arms and plurality of compensator arm guide rolls being the same number, with the strand being supplied to and guided by each compensator arm and guide roll to a separate take-up spindle.

5,072,890

OPTICAL SYSTEM

Benjamin Klaus, Jr., Lexington; Gordon C. MacKenzie, North Billerica, and Richard A. Beckerleg, Boxford, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 18, 1989, Ser. No. 395,692
Int. Cl.[5] G02G *5/14*
U.S. Cl. 244—3.16 **7 Claims**



1. An optical system comprising:

means for focusing a portion of electromagnetic energy onto a focal plane including means for rotating the focused portion about an axis of rotation of the focusing means;

an array of detectors disposed in a detector plane, such array of detectors being arranged in a plurality of sets of such detectors, each one of such sets being disposed along a different radially extending region from a central region of the array;

means for skewing the detector and focal planes; and

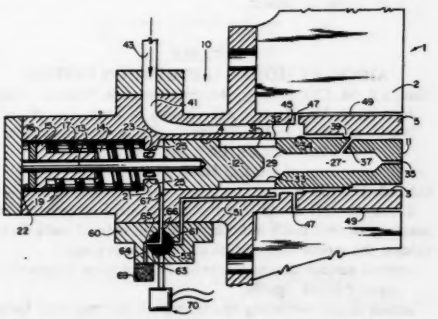
means, coupled to the skewing means, for processing signals produced by a selected one of the plurality of sets of detectors, such selected one of the sets being disposed in one of the radially extending regions disposed along a line formed by the intersection of the skewed detector and focal planes.

5,072,891

COMBINATION ACTUATOR AND COOLANT SUPPLY FOR MISSILE AND ROCKET VECTOR CONTROL

Robert J. Cavalleri, and Harvey J. Readey, both of Orlando, Fla., assignors to Applied Technology Associates, Orlando, Fla.

Filed Nov. 22, 1989, Ser. No. 440,108
Int. Cl.[5] F42B *10/02, 10/66*
U.S. Cl. 244—3.21 **14 Claims**



1. In a projectile having a body and flying through forces supplied by propulsion means having at least one nozzle, a strut mounted on said projectile and movable between a first re-

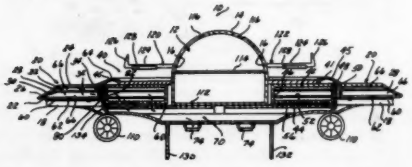
tracted position and a second extended position by actuator means, and supply means for supplying coolant to said strut through a passageway having an adjustable orifice including a radial port in said strut, the improvement comprising said supply means also supplying said coolant to said actuator means for extending and retracting said strut said adjustable orifice enlarging as said strut is moved toward said extended position.

5,072,892

AERODYNAMIC DEVICE

Alfred C. Carrington, 33811 Morse St., Mount Clemens, Mich. 48043

Filed Dec. 1, 1989, Ser. No. 444,319
Int. Cl.[5] B64C *29/04, 29/02, 29/00, 15/00*
U.S. Cl. 244—23 C **3 Claims**



1. An aerodynamic vehicle comprising:

a central body including a vertical axis, an outer wall, and a bottom wall;

a first rotatable disk concentric with the central body axis, said first disk rotatable in a first direction;

a second rotatable disk concentric with the central body axis, said second disk rotatable in a second direction opposing the first direction;

first vane means connected to the first disk for drawing fluid vertically downward and radially inward to compress the fluid;

second vane means connected to the second disk for drawing fluid vertically downward and radially inward to compress the fluid;

passage means for conveying the compressed fluid from the first and second vane means;

selectively vectorable nozzle means, in communication with the passage means, for discharging the compressed fluid below the central body;

means for rotating the first and second disks in opposite directions to counteract torque generated by the first and second disks; and

jet means connected to the central body for providing additional thrust to the vehicle and for generating electrical and hydraulic power.

5,072,893

AIRCRAFT MODAL SUPPRESSION SYSTEM

Abhijit J. M. Chakravarty, Renton; Steven R. Cooper, Seattle; John K. H. Ho, Renton, and Chuong B. Tran, Everett, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 28, 1987, Ser. No. 55,801
Int. Cl.[5] B64L *13/16*
U.S. Cl. 244—76 R **19 Claims**

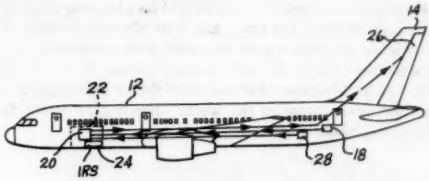
1. An aircraft modal suppression control system for suppressing aircraft body deflections due to natural body flexure modes, the modal suppression system comprising:

control surface means controllably deploying responsive to input control signals;

sensor means including one sensor predeterminedly located on the aircraft body to produce an excitation signal representative of excitation of the body in at least two natural modes;

velocity means for producing a velocity signal representative of aircraft velocity; and

control logic means for producing predetermined control



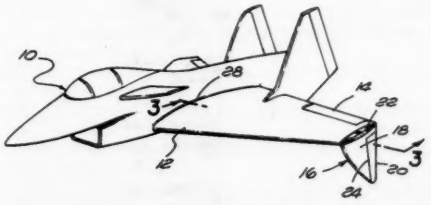
surface control signals responsive to said excitation signal and said velocity signal such that said control surface means is deployed to create forces on the aircraft body to suppress said natural mode excitations.

5,072,894

APPARATUS AND METHOD FOR INCREASING THE ANGLE OF ATTACK OPERATING RANGE OF AN AIRCRAFT

Daniel R. Cichy, Reynoldsburg, Ohio, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 2, 1989, Ser. No. 415,676
Int. Cl.[5] B64C *5/06*
U.S. Cl. 244—91 **5 Claims**



1. An apparatus for increasing the angle of attack operating range of an aircraft, comprising:

a pair of substantially vertical tip fins, each having a main portion and an aft portion, said main portion securely connected to the tip of the aircraft wing and having a swept back leading edge, each leading edge of each said tip fins being swept back in an approximate range between 25° and 50° from a line perpendicular to the surface of said airplane wing, said aft portion comprising a substantially vertical aileron hingedly connected to said main portion of the tip fin for controlling the roll of said aircraft at high angles of attack, a hinge line being formed at said hinged connection being swept back, the sweeping back of said leading edge and said hinge line being such that at high angles of attack the oncoming airflow becomes nearly perpendicular to said leading edge and said hinge line thereby increasing the performance of the vertical tip fin when deflected.

5,072,895

CARGO PLATFORM ASSEMBLY MOUNTED TO A HELICOPTER

Mark Camus, 9301 SW. 92nd Ave., B104, Miami, Fla. 33176

Filed Jul. 5, 1990, Ser. No. 548,257
Int. Cl.[5] B64C *1/20;* **B60R** *9/45*
U.S. Cl. 244—118.1 **21 Claims**

1. For use on a helicopter having a pair of oppositely disposed parallel skid tubes extending longitudinally below a helicopter fuselage, a cargo platform assembly adapted for

attachment to at least one of the skid tubes and the helicopter fuselage, said assembly comprising:

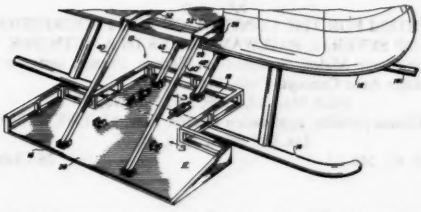
a frame structure including a plurality of substantially rigid, sufficiently strong elongate tubes interconnecting with one another forming a longitudinal portion, a transverse portion, and a railing extending at least partially around an outer perimeter of said frame,

said elongate tubes include metal tubes having a rectangular cross-sectional configuration,

said metal tubes being of sufficient strength to support a substantial load placed on a support surface,

said support surface mounted in substantially covering relation to an upper side of said frame structure defining a platform, mounting means for mounting said frame structure to at least one of the skid tubes,

said mounting means structured to permit lateral movement of the skid tube with respect to said frame structure,



platform support means connecting in supporting relation between said frame structure and the fuselage of the helicopter,

a cross bar mounted to and extending transversely across a cabin floor of the helicopter,

said cross bar including a channel configuration adapted to fit in mounting, covering relation to a transversely extended rib on the cabin floor, each opposite end of said cross bar further being dimensioned and configured to adaptively receive one end of an outboard support structure for connection thereto as a means for added support to the platform assembly,

said cross bar including a plurality of connecting pins each being adapted to pass through said cross bar and said transverse rib for securing said cross bar thereto, and

said cross bar includes two telescopically extended portions structured and configured to permit varied adjustment of the length of said cross bar.

5,072,896

POWERED CANOPY BREAKERS

Robert G. McIntyre, Manhattan Beach, and Alexander B. McDonald, Long Beach, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed May 14, 1990, Ser. No. 522,808

Int. Cl.[5] B64D *25/10*

U.S. Cl. 244—122 AF **17 Claims**

9. A device attached to an ejection seat, that penetrates a canopy when the ejection seat is ejected, comprising:

a) a housing having a first cavity, a first opening and a snubber;

b) a piston having a base portion within said first cavity and a cutter portion extending from said housing through said first opening, said piston having a first bore within said cutter portion, a second bore and at least two apertures in said base portion, said base portion being restrained from movement out of said first cavity by said snubber, said piston adapted to travel within said housing;

c) a breech within said first cavity having a third bore in fluid communication with said first bore;

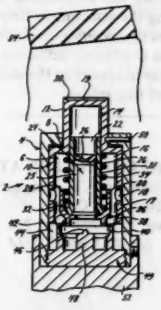
d) cartridge means within said third bore for powering said piston in a direction toward the canopy, when said cartridge means is detonated;

e) a cup attached to said breech having an oblique outer radial seat;

f) at least two retaining balls contiguous to said oblique outer radial seat and said housing, said retaining balls support said breech within said first cavity and release from said breech when said piston travels a predetermined distance and said apertures align with said retaining balls;

g) a firing pin attached to said housing within said first cavity; and

h) a spring extending from said cup to said piston, said spring biases said cartridge means into said firing pin when said



retaining balls release from said breach; whereby when the ejection seat is ejected and said cutter portion presses against the canopy, said piston moves relative to said breech in a direction toward said firing pin, simultaneously compressing said spring, said piston movement continuing until said retaining balls are aligned and pushed into said apertures by said spring and said oblique outer radial seat, wherein said breech is released from said retaining balls and said cartridge means is pushed into said firing pin by said spring, detonating said cartridge means and driving said cutter portion into the canopy.

5,072,897

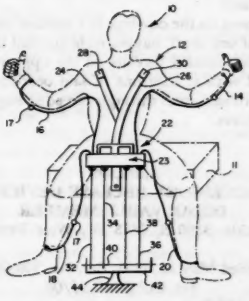
PILOT HARNESS FITTING INCORPORATING RESTRAINTS FOR ARMS, LEGS, AND AID OF GRAVITY

Armand J. Aronne, New York, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Aug. 15, 1990, Ser. No. 567,756

Int. Cl.[5] B64D *25/02, 17/30*

U.S. Cl. 244—122 AG **5 Claims**



1. A fitting for an aviator's harness, comprising:

a first connector secured to the harness and housing first coupling members therein;

a plurality of restraint lines, each of which is connected between a limb of the aviator and one of the first coupling members;

a second connector secured to an aviator's seat and removably latched to the first connector;

a plurality of attachment lines connected at lower ends thereof to a cockpit floor;

a second coupling member housed within the second connector, each attachment line having an upper end connected to the second coupling member, the first and second coupling members coupling respective restraint and attachment lines in response to seat ejection thus resulting in inward limb displacement;

stop means mounted to the restraint lines for limiting the inward displacement; and

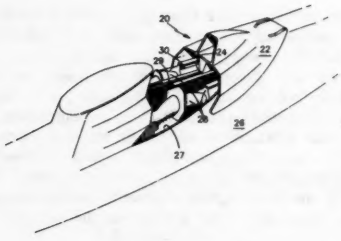
shear means securing the attachment lines to the cockpit floor for releasing the attachment lines upon displacement of the stop means to a position contacting the first connector member thus deploying sufficient tension in the coupled lines to cause breakage of the shear means and subsequent attachment line release.

5,072,898

ENGINE COWLING ROLLER ATTACHMENT

Armand F. Amelio, Yonkers, N.Y., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 31, 1990, Ser. No. 576,571
Int. Cl.[5] B64C *1/14*
U.S. Cl. 244—129.4 **8 Claims**



3. An attachment mechanism for an aircraft and an aircraft cowling, the cowling being movable between an open and closed position and having a body shaped to conform to the aircraft when in the closed position, wherein the attachment mechanism comprises:

a plurality of guides disposed on the aircraft;

a plurality of bearings engaged with said guides in a manner permitting translation of said bearings along said guides;

threaded apertures disposed in a fixed relationship to said bearings; and

a shaft disposed on the cowling in a manner permitting axial rotation of said shaft, having right-handed threads on one end and left-handed threads on the opposite end of said shaft, and with at least one of said bearings disposed on each end of said shaft through threaded engagement with said apertures.

5,072,899

KITE ACCESSORY RELEASE DEVICE WITH DISSOLVABLE MEMBER

Steven L. Nickle, 3390 S. 5475 W., West Valley City, Utah 84120

Filed May 15, 1991, Ser. No. 700,612
Int. Cl.[5] B64C *31/06*
U.S. Cl. 244—155 R **8 Claims**

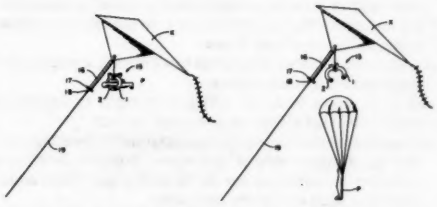
1. A device for releasably supporting a solid object from an airborne vehicle comprising:

a pair of pivotally connected cooperating jaws;

means for biasing said pair of jaws in an open position;

means for temporarily holding said pair of jaws in a closed position;

said means for temporarily holding said pair of jaws in a closed position comprising a dissolvable member;



means for dissolving said dissolvable member; and

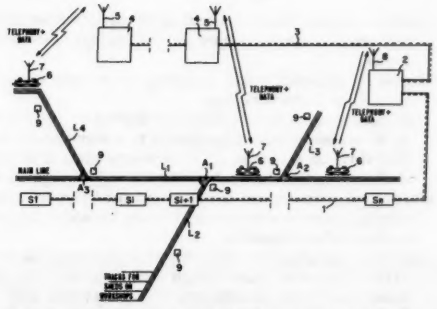
means for attaching said device to said airborne vehicle.

5,072,900

SYSTEM FOR THE CONTROL OF THE PROGRESSION OF SEVERAL RAILWAY TRAINS IN A NETWORK

Jean-Pierre Malon, Savignac-Les-Eglises, France, assignor to Aigle Azur Concept, Paris, France

Filed Mar. 19, 1990, Ser. No. 496,202
Claims priority, application France, Mar. 17, 1989, 89 03555
Int. Cl.[5] B61L *3/16, 25/02*
U.S. Cl. 246—5 **36 Claims**



1. A system for the control of the progress of a plurality of railway trains in a railway network, comprising:

a plurality of on-board devices for disposition on respective trains for detecting the position of the train with respect to the track;

a plurality of means for transmitting and receiving communication messages for disposition on respective trains; and

a central station, said central station comprising:

a first storage means for the instantaneous storage of the relative positions of all of the trains in the railway network,

a second storage means for storing the itineraries of each of the trains and the parameters of the railway network related to the speed range and the performance of the rolling stock in service, and

means for receiving positional information from the plurality of trains detected by said on-board devices and transmitted by said means for transmitting and receiving, and transmitting at regular time intervals messages containing identification numbers of the trains in circulation in the railway network which are authorized to progress according to their itinerary after taking into account the positional information and the speed range parameters in said second storage means;

wherein the messages transmitted from said central station are received by said means for transmitting and receiving on the respective trains, and wherein said plurality of on-board devices each comprises means for recognizing

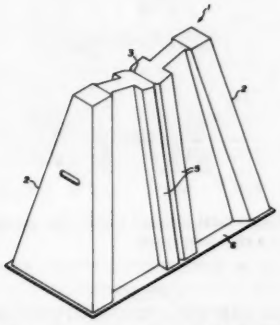
the identification number of its respective train and means for controlling the stopping of its respective train which in the absence of the train's respective identification number in the message received from said central station stops the train.

5,072,901

PIPE SUPPORT STAND

Lyle Scott, P.O. Box 782, Morinville, Alberta, Canada T0G 1P0

Filed Jun. 20, 1990, Ser. No. 540,705
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—49 2 Claims



1. A stand for supporting an elongate tubular member which comprises:

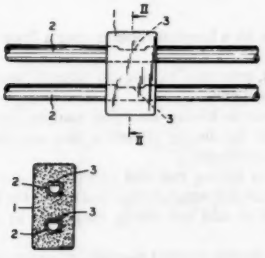
a hollow, generally pyramidal shaped modular body formed of plastic, said body further defining an generally arcuate recess on its upper surface adapted to receive the tubular member therein, said body forming four angled legs at the outer corners thereof and a pair of central ribs on the front and rear sides thereof and said body further having a substantially continuous base forming an outwardly extending rectangular lip.

5,072,902

STRUCTURE FOR SECURING PIPES TOGETHER

Katsushi Washizu, Numazu, and Yuji Miyauchi, Shizuoka, both of Japan, assignors to Usui Kikusai Sangyo Kaisha Ltd., Japan

Filed Nov. 27, 1990, Ser. No. 618,727
Claims priority, application Japan, Nov. 29, 1989, 1-138190[U]
Int. Cl.[5] F16L *3/08*
U.S. Cl. 248—65 8 Claims



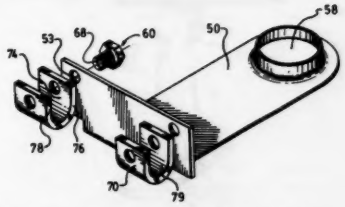
1. A pipe securing structure comprising: a plurality of elongated pipes, each said pipe having a longitudinally extending securing section with opposed longitudinal ends and a selected cross-sectional configuration, each said pipe further including portions extending longitudinally from the respective opposed ends of the securing section and defining cross-sectional configurations different from the securing section; and a bracket body unitarily injection molded from a thermoplastic resin such that the thermoplastic resin of the bracket body surrounds and engages the entire securing section of each said pipe and regions of each said pipe adjacent the opposed ends of the respective securing sections, whereby the surrounding engagement of the thermoplastic resin with the securing sections and regions of each said pipe adjacent the respective securing sections prevents relative movement between the pipe and the bracket body.

5,072,903

PIPE-STAY CLEVIS ASSEMBLY

Tyler S. Griffin, Maryhill, Canada, assignor to Valley Metal Products Limited, Kitchener, Canada

Filed May 13, 1991, Ser. No. 698,980
Int. Cl.[5] F16L *3/24*
U.S. Cl. 248—72 6 Claims



1. Pipe-stay clevis assembly, which is suitable for supporting a pipe from a rod or flange member, wherein:

the assembly includes a pipe-stay member, having a means for retaining the pipe thereto;

the assembly includes a clevis member;

the clevis member includes a U-shaped portion, in that the member has two limbs, and the limbs define a space between the two limbs, the space being suitable for receiving the rod or flange member;

the clevis member is provided with a threaded hole, which is formed right through the thickness of a first one of the limbs;

the assembly includes a bolt;

the bolt passes through the threaded hole;

the bolt is sufficiently long that, having passed through the threaded hole, the bolt protrudes into the said space between the limbs, and protrudes to a sufficient extent that, in use, the bolt engages with the rod or flange member received in the space between the limbs;

the bolt is sufficiently short that the bolt does not reach the other of the two limbs;

the material and dimensions of the U-shaped portion are such that when the bolt is tightened onto the rod or flange received within the space, the action of tightening the bolt onto the rod or flange, is sufficient to produce a slight deflection apart of the limbs;

the pipe-stay member and the clevis member are separable components of the assembly;

the pipe-stay member is provided with a plain, un-threaded hole, formed right through the thickness of the member;

the pipe-stay member is in engagement with the said first limb of the clevis member, such that the un-threaded hole in the pipe-stay member is aligned with the threaded hole in the limb;

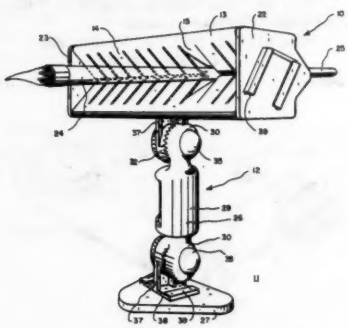
the bolt passes through both the un-threaded hole and through the threaded hole;

the bolt includes a head, and the pipe-stay member is secured between the head and the said first limb;

and the length of the bolt is such that, having passed through both holes, the bolt protrudes into the said space between the limbs, and protrudes to a sufficient extent that, in use,

the bolt engages with the rod or flange member received in the space between the limbs.

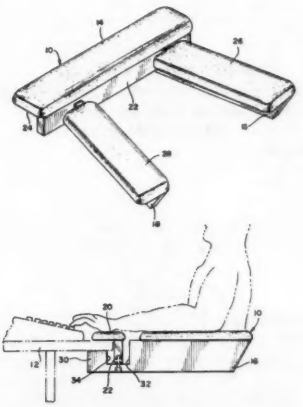
5,072,904
ARTISTS' BRUSH HOLDER
Kevin D. Taylor, 1716 N. 1900 West, Ogden, Utah 84404
Filed Apr. 16, 1990, Ser. No. 509,489
Int. Cl.[5] A46B *17/00*
U.S. Cl. 248—110 **18 Claims**



1. A holder for artist paint brushes comprising:
a three dimensional support frame having a front, rear, right side, left side, bottom and top, the front and rear being spaced substantially apart;
a row of equal length, parallel, flexible reeds cantilevered from the top of the frame at its front;
a row of equal length, parallel, flexible reeds cantilevered from the bottom of the frame at its front, the free ends of the reeds of the two front rows being juxtaposed;
a row of equal length, parallel, flexible reeds cantilevered from the top of the frame at its rear;
a row of equal length, parallel, flexible reeds cantilevered from the bottom of the frame at its rear, the free ends of the reeds of the two rear rows being juxtaposed, the four rows being mutually parallel; and
means supporting the frame upon a desk or the like; wherein the reeds are thin and flat laterally to the frame; and
the free end of each reed is substantially curved rearwardly of the frame.

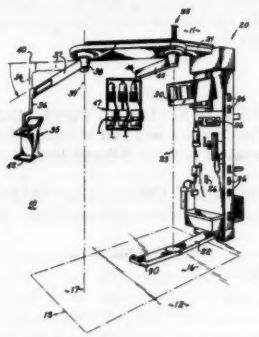
5,072,905
WRIST AND FOREARM SUPPORT APPARATUS
Robert G. Hyatt, 3505 S. Frick Ave., Tucson, Ariz. 85730
Filed Sep. 21, 1990, Ser. No. 586,071
Int. Cl.[5] B43L *15/00*
U.S. Cl. 248—118 **7 Claims**

6. An apparatus for clamping to a table to support both wrists and forearms of a person while working at the table comprising:
(a) a generally rectangular wrist support member;
(b) a pair of generally rectangular armrest members pivotally connected at respective forward portions and disposed generally perpendicularly to said wrist support member; and
(c) a structural element interconnecting said armrest members and said wrist support members, each of said generally rectangular armrest members having a transverse groove along one lengthwise edge at a forward portion having said structural element disposed in the groove so



that said structural element bisects the groove thereby providing a clamping space.

5,072,906
HOSPITAL BED WITH PIVOTING HEADBOARD
L. Dale Foster, Brookville, Ind., assignor to Hill-Rom Company, Inc., Batesville, Ind.
Continuation-in-part of Ser. No. 144,188, Jan. 15, 1988, abandoned. This application Feb. 14, 1989, Ser. No. 309,886
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—122 **2 Claims**



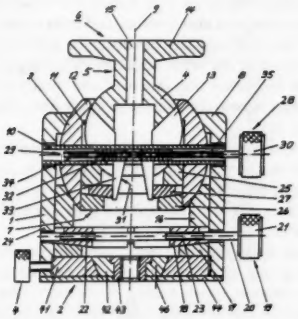
1. Apparatus for a hospital room having a floor and ceiling comprising:
an elongated, generally rectangular hospital bed site having two opposed ends,
a power column having electrical outlets, gas outlets, a monitor for the display of patient data and other patient-treating accessories,
an upper arm having one end pivotally mounted on said ceiling on an axis which is over one end of the bed site, the other end of said arm being connected to said power column,
a lower arm having one end pivotally mounted on said floor on the same axis as said upper arm, the other end of said lower arm being connected to said power column,
said two arms supporting said power column and permitting said power column to swing through an arc that passes from one side of said bed site past said one end of said bed site to the other side of said bed site.

5,072,907

TRIPOD HEAD

Philippe Vogt, Frohalpstrasse 65, 8038 Zurich, Switzerland

Filed Jul. 6, 1989, Ser. No. 376,116
Claims priority, application Switzerland, Jul. 6, 1988, 2565889
Int. Cl.[5] F16M *11/00*
U.S. Cl. 248—181 9 Claims



1. A tripod head for receiving an optical instrument, comprising:

a housing with a first end, a second end, an opening at the first end, and a connecting device at the second end for connection to a tripod;

a rotation-symmetrical joint body located within the housing and extending at least to some extent out of the housing, the joint body being in the form of an oblate ellipsoid with a major axis, and being rotatable within the housing around an axis which is transverse to the major axis; and

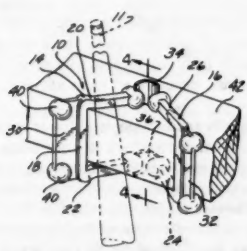
a clamping mechanism for applying a clamping force to the joint body to secure the joint body in position, the clamping mechanism including a clamping surface which is displaceable toward the joint body in a first direction, sloping surfaces which are in slidable contact with each other, and a setting device for displacing one of the sloping surfaces in a direction which is transverse to the first direction, to thereby displace the clamping surface toward the joint body to obtain the clamping force.

5,072,908

RELEASABLY MOUNTABLE BILLIARD/POOL CUE HOLDER

Lester B. Lodrick, 603 E. Meyers, Hazel Park, Mich. 48030

Filed Sep. 24, 1990, Ser. No. 587,081
Int. Cl.[5] A47F *7/00*
U.S. Cl. 248—231.8 9 Claims



1. A holder releasably mountable on a support surface for supporting an elongate member, the holder comprising:

a normally planar body, the body including:

first and second article support members;

a two part hinge means for hingedly connecting the first and second article support members for pivotal movement with respect to each other; and

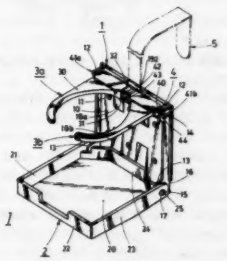
and the adjoining portions of the first and second article support members reversibly forming a clamp for releasably clamping the body onto a support surface when opposite outward movement of the two parts of the hinge means causes reversible inward pivotal movement of the first and second article support members toward each other, the first and second article support members, when in the inwardly pivoted position, supporting an elongated member in a generally upright position with respect to the support surface.

5,072,909

ADJUSTABLE CUP HOLDER IN THE CAR

Tzu-Ping Huang, 4th Floor, 12-1 Alley 15, Lane 214, Chunghsin Road, Sec. 4, Sanchung City, Taipei Hsien, Taiwan

Filed May 10, 1990, Ser. No. 522,593
Int. Cl.[5] A47K *1/00*
U.S. Cl. 248—311.2 4 Claims



1. An adjustable cup holder in the car, comprising:

a fixing plate, which is generally a rectangular or square plate body whereon a plurality of openings are provided, a pair of ears each are provided to the two sides on the upper and lower edges on the front side of plate body, a hole is provided to the center of the upper pair of ears, a hinge pin is provided to each of the two outer sides of lower pair of ears, and a notch is provided to each corner on the two lower sides of plate body;

a cover plate, which is provided with retainers on the edges on the left, right, front and rear sides of its plate body, and a hole is provided to each of ends of left and right retainers of plate body for pivotal engagement with the lower pair of ears on the plate body of fixing plate for folding the cover plate to cover the fixing plate or the cover plate can be vertical to the fixing plate to form a 90° angle therebetween so that the cover plate is in a horizontal state to be ready for use;

a left arm and a right arm, which are generally arcuate bar bodies with a similar shape and structure corresponding to each other; and

an arm bar, which is a bar body provided with short hinge pins at its two ends to engage with the left and right arms and then pivotally caught onto the ears on the two sides on the upper edge of the plate body of fixing plate through the said hinge pins so that it can be folded to contact the fixing plate or vertical to the fixing plate to form a 90° angle therebetween to be in a horizontal state and ready for use; which is characterized by the following:

a pair of oblique upper and lower spring leaves are provided to the upper and lower sides on the front side of plate body of the fixing plate;

a sleeve with a hole corresponding to the shape of bar body of arm bar is provided to the rear (inner) end thereof, and a spring leaf with a positioning stand at its lower side is provided to the inner edge of sleeve;

and said arm bar is a solid square bar body with a rack face

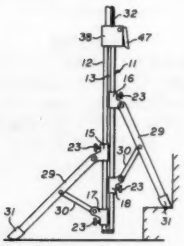
of a plurality of arcuate racks in its middle and separatory stand at the center on its front side.

5,072,910

ADJUSTABLE TRIPOD STAND

Randall L. May, 7712 Unit B Talbert Ave., Huntington Beach, Calif. 92648

Filed Jun. 11, 1990, Ser. No. 535,580
Int. Cl.[5] F16M *11/00*
U.S. Cl. 248—412 **26 Claims**



1. An adjustable tripod stand having independently adjustable legs comprising:

an upright portion for supporting an object at its upper end,

a plurality of independently movable collar members slidably mounted on said upright portion and longitudinally adjustable relative to one another and to said upright portion for selective positioning thereon,

releasable fastening means on said collars for securing same to said upright portion at selected positions, and

a plurality of movable leg members operatively connected at their upper ends to different ones of said collar members and operable on independent movement of said collar members for selective independent longitudinal positioning and radial extension relative to said upright portion and to one another for supporting said upright portion, whereby

said stand may be erected in limited or confined areas, on multi-level surfaces, and on level surfaces, and the positioning of said collars allows the longitudinal axis of the stand to be disposed in an off-vertical axis position for positioning the center of gravity of the supported article relative to the center of the supporting legs.

5,072,911

BARRIER MOLD FOR FORMING OPENINGS IN CONCRETE STRUCTURES

Duane D. Logsdon, Fullerton, Calif., assignor to The Logsdon Foundation, Stanton, Calif.

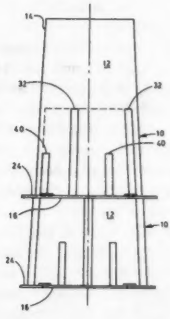
Filed Jul. 3, 1990, Ser. No. 547,873
Int. Cl.[5] E04G *15/00*
U.S. Cl. 249—61 **6 Claims**

1. A concrete barrier structure comprising: which is adapted to be selectively used either (1) upon a horizontal surface so as to form a vertically extending opening in a solid concrete body after "wet" concrete has been cast around the exterior of said barrier structure and allowed to set up so as to form said body or (2) to support another structure which is identical to said barrier structure when said barrier structure is located upon a horizontal surface so as to form a vertically extending opening which is longer than said first mentioned opening after "wet" concrete has been cast around the exterior of said barrier structure and said other structure and then allowed to set up so as to form said body, said barrier structure

a vertically extending peripheral wall means for retaining "wet" concrete, said wall means having a lower end and an upper end, said wall means being of such thickness and being tapered so that the lower end of said other structure can be selectively located around said peripheral wall means of said barrier structure in either an upper position in which said lower end of said other structure is between said ends of said peripheral wall means of said barrier structure with the peripheral wall means of said other structure extending around a part of said peripheral wall means of said barrier structure and extending upwardly from said upper end of said barrier structure or a lower position in which the upper end of said other structure is closer to said upper end of said barrier structure than in said upper position and in which said lower end of said other structure is also between said ends of said peripheral wall means of said barrier structure with the peripheral wall means of said other structure extending around a part of said peripheral wall means of said barrier structure and extending upwardly from said upper end of said barrier structure;

closure means for preventing "wet" concrete from entering the interior of said peripheral wall means at said upper end of said peripheral wall means, said closure means covering said upper end of said peripheral wall means of said barrier structure;

a series of equally spaced, identical, upper support means for holding said other structure in said upper position, said upper support means having upper extremities and being located on said peripheal wall means of said barrier structure, said upper support means of said barrier structure extending outwardly from said peripheral wall means of



said barrier structure so as to each terminate the same distance from said lower end of said peripheral wall means of said barrier structure, the lower end of said other structure being capable of resting upon said upper extremities of said support means of said barrier structure when said other structure is in said upper position;

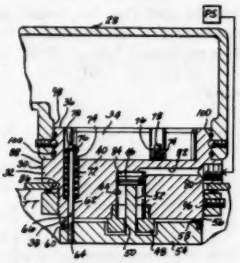
a series of equally spaced, identical, elongated vertically extending groove means for allowing movement of said other structure relative to said barrier structure between said lower position and said upper position, said groove means being located in said peripheral wall means of said barrier structure, said groove means in said other structure being capable of fitting around said upper support means on said barrier structure so as to allow such movement; and

a series of equally spaced, identical lower support means for holding said other structure in said lower position, said lower support means having upper extremities and being located on said peripheral wall means of said barrier structure, said lower support means of said barrier structure extending outwardly from said peripheral wall means of said barrier structure so as to each terminate the same distance from said lower end of said peripheral wall means of said barrier structure, the lower end of said other structure being capable of resting upon said lower extremities of said support means of said barrier structure when said other structure is in said lower position.

5,072,912
VAPOR VENT VALVE

Leo J. LeBlanc, 4837 Shellmarr La., Bloomfield Hills, Mich. 48013, and Bruce R. Johnson, 2374 W. Giles Rd., Muskegon, Mich. 49445

Filed Jul. 9, 1991, Ser. No. 727,076
Int. Cl.[5] F16K *31/122*
U.S. Cl. 251—63.5 **12 Claims**



1. A vent valve for venting the interior of a storage tank, said vent valve comprising:

a hollow tubular housing having a central passage extending axially therethrough from one end of said housing to the other, mounting means on the exterior of said housing for fixedly and sealingly mounting said housing in an opening through a top wall of said storage tank with said one end of said housing disposed at the exterior of said tank and the other end of said housing disposed within the interior of said tank, means at said other end of said housing defining an annular valve seat, a valve head member mounted for movement axially of said housing toward and away from said valve seat and operable in a valve closed position to sealingly engage said seat to sealingly close said central passage at said other end of said housing, means integral with said housing defining a piston chamber sealed at one end and extending coaxially of said central passage, a piston slidably and sealingly received within said piston chamber, a piston rod fixedly secured to said piston and projecting from the other end of said chamber to a piston rod end fixedly secured to said valve head member, a plurality of spring means engaged between said housing and said valve member at locations within said central passage externally of said piston chamber and symmetrically disposed about said axis biasing said valve member toward said valve closed position, and flow passage means extending through said housing into said one end of said piston chamber for supplying pressure to said one end of said chamber to drive said valve head member away from said seat to open said other end of said central passage.

5,072,913
SPRING LOADED LOCKING HANDLE FOR ANGLE COCK OR THE LIKE

John B. Carroll, Irwin, and Robert T. Sarsfield, Jeannette, both of Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Apr. 12, 1991, Ser. No. 684,112
Int. Cl.[5] F16K *35/02*
U.S. Cl. 251—99 **16 Claims**

1. For a valve device having valve means in the body thereof rotatably operable by a handle member to open and closed valve positions delimited by stop means formed on said body, there is provided a locking handle assembly comprising:

(a) a socket member fixed to a stem of said valve means that projects from said body;

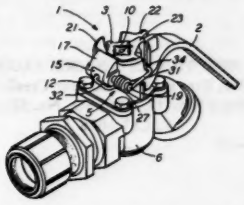
(b) a mounting lug formed on said socket member;

(c) a fulcrum pin on said mounting lug;

(d) said handle member being pivotally connected by said fulcrum pin to said mounting lug to permit raising said handle member from said body to an unlocked position and lowering said handle member toward said body to a locked position;

(e) a lug on said handle member engageable with said stop means in said locked position of said handle member and disengageable from said stop means in said unlocked position of said handle member; and

(f) a helical torsion spring carried on said fulcrum pin comprising:



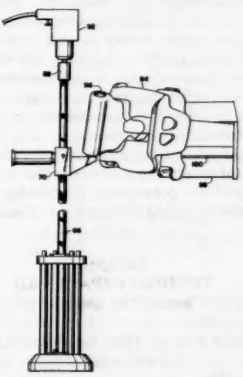
(i) a coil portion having at least one helical winding through which said fulcrum pin passes; and

(ii) first and second legs extending from said coil portion, said first leg being fixed relative to said socket member and said second leg engaging said handle member to urge said handle member toward said locked position under tension.

5,072,914
RAILWAY FREIGHT CAR COUPLER LIFT

Jimmie R. Thrift, 5426 Valdosta Hwy., Waycross, Ga. 31501, and Nass Hendley, 201 William St., Homerville, Ga. 31634

Filed Jul. 9, 1990, Ser. No. 549,977
Int. Cl.[5] B23Q *19/04*
U.S. Cl. 254—100 **2 Claims**

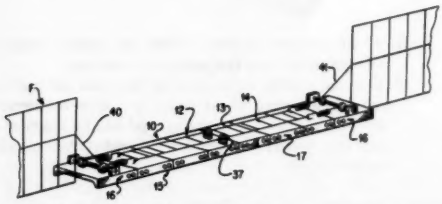


1. A railway freight car coupler lifting device comprising:

a base plate for supporting said device, a load bearing carried by and located substantially centrally of said base plate, a top plate spaced vertically above said base plate, an elongated rod having opposite end portions, one said end portion being journalled in said load bearing, a non-load bearing carried by and located substantially centrally of said top plate, said elongated rod passing through said non-load bearing and being laterally supported thereby to maintain said rod in its vertical position, a plurality of elongated spaced supports about said rod for rigidly connecting said top plate to said base plate and for maintaining said non-load bearing in vertical alignment with said load bearing, another of said end portions of said rod being screw threaded at least generally above said top

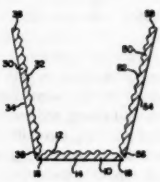
plate, a metal block having an internally threaded passageway threadedly engaged with said other end portion of said rod, a lifting arm rigidly attached to and extending laterally of said block, a socket attached to said other end portion at its upper extremity adapted to be rotated by an impact power wrench for causing said block to move upwardly and downwardly along said rod said being maintained vertical by said bearings and spaced lateral support provided by said top and base plates even during lifting of a railway freight coupler.

5,072,915
ELECTRIC LIVESTOCK GUARD
Murphy Shirley, Rte. 1, Box 116, Bear Creek, Ala. 35543
Filed May 14, 1990, Ser. No. 522,561
Int. Cl.[5] A01K *3/00*
U.S. Cl. 256—14 **8 Claims**



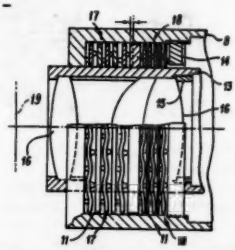
1. An electric livestock guard which is mounted in an access passageway in a fence, said guard comprising, a base having spaced end portions and at least one intermediate segment, said end portions and said intermediate segment of said base being formed in a low profile of a material over which vehicle traffic may pass and having generally planar upper surfaces, anchor means for securing said base to the ground, at least one insulator means mounted to each of said end portions of said base, means for mounting said insulator means to said end portions of said base, electrifiable grid means, said grid means having opposite ends, first connector means for connecting one of said ends of said grid means to one of said insulator means and second connector means for connecting the other of said ends of said grid means to the other of said insulator means, and at least said first connector means being resilient to thereby place tension on said grid means to maintain said grid means taut and in vertical relationship with respect to said base, means for electrifying said grid means, and means for joining said intermediate segment to said end portions so that said upper surface thereof is in generally coextensive relationship with respect to said upper surfaces of said end portions of said base.

5,072,916
TUNDISH IMPACT PAD
Madjid Soofi, St. Charles, Ill., assignor to Magneco/Metrel, Inc., Addison, Ill.
Filed May 29, 1990, Ser. No. 530,164
Int. Cl.[5] C21B *3/00*
U.S. Cl. 266—275 **8 Claims**



1. In a tundish vessel used in the iron and steel industry having a floor, a back wall, a front wall, two sidewalls, a region of impact, and a drain, the improvement comprising an impact pad having a wavy upper surface located on the floor of the tundish vessel, the wavy surface being configured to reduce the horizontal surface area on the floor of the vessel, and one or more additional impact pads located on the sidewalls of the tundish vessel.

5,072,917
UNIFORM LOADING SPRINGS OF IMPROVED CONFIGURATION
Walter F. Pleva, 263 Sand Pine Rd., Indialantic, Fla. 32903
Continuation-in-part of Ser. No. 52,066, May 21, 1987, abandoned. This application May 23, 1988, Ser. No. 197,321
Int. Cl.[5] F16F *1/34*
U.S. Cl. 267—162 **2 Claims**

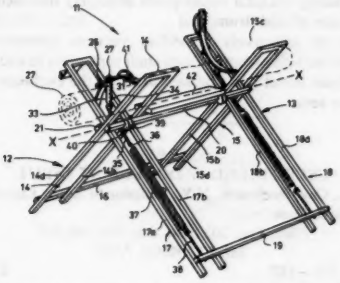


1. A spring able to be utilized between two adjacent components, without scarring or defacing either such component, comprising a flat, flexible, resilient, double surfaced component having the same number of uniform, symmetrically shaped protrusions on each surface, each adjacent pair of protrusions being equidistant from each other and being substantially spherical in shape so as to be usable as multiple fulcrums, the substantially spherical protrusions on one surface of said component being precisely intermediate the substantially spherical protrusions on the other surface, such that no protrusion on the one surface is exactly opposite a protrusion on the other surface, said component being flat in an unstressed state and when placed under stress between adjacent members that are in contact with said protrusions, capable of undertaking flexure in the manner of simple beam bending between such protrusions, with the force of the spring increasing by the number of protrusions utilized, the spring further utilizing sandwich construction, involving the use of a plurality of annularly shaped members used in a stack, where the protrusions are hollow, with the hollow protrusions of one component fitting within the protrusions of the adjacent component, with such stacking increasing the force of the spring, in proportion with the number of springs utilized.

5,072,918
WORKPIECE CLAMPING DEVICE
Norman J. Campbell, High Cayton, South Stainley, Harrogate, Yorks, England
Filed May 22, 1989, Ser. No. 355,475
Claims priority, application United Kingdom, May 26, 1988, 8812549
Int. Cl.[5] B25H *1/06*
U.S. Cl. 269—296 **12 Claims**

1. A workpiece clamping device comprising:
support means defining a reaction surface,
a clamp arm,
means pivotally mounting said clamp arm on said support means for turning movement between a workpiece holding position in which it clamps a workpiece between itself and said reaction surface and a release position in which said workpiece can be placed on or removed from said reaction surface and,
resilient biasing means urging said clamp arm to turn about

said pivotal mounting means towards said workpiece holding position when said clamp arm is located between said holding position and a neutral position and to turn said clamp arm away from said holding position towards said release position when said clamp arm is located on the



side of said neutral position remote from said holding position, and

trigger means engageable by said workpiece itself on approach to said reaction surface whereby to cause said clamp arm to move from said release position past said neutral position towards said holding position.

5,072,919

VERSATILE FOLDING APPARATUS TO PROVIDE FOLDED PRODUCTS OF SELECTIVELY DIFFERENT FOLDING PATTERNS

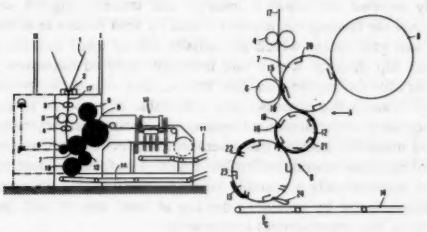
Eckhard Schneider, Stadtbergen, and Erwin Saalfrank, Neusäss, both of Fed. Rep. of Germany, assignors to MAN ROLAND Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Jul. 10, 1990, Ser. No. 551,132

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1989, 3925398

Int. Cl.[5] B42C *1/00*

U.S. Cl. 270—49 **13 Claims**



1. A folding apparatus adapted to receive a traveling substrate web, for selectively providing products folded in accordance with different folding patterns, comprising

a cutter blade cylinder (6);

a combination needle - folding or tucking blade cylinder (7) operatively associated with the cutter blade cylinder, for cutting a longitudinally folded web (17) into first longitudinally folded cut products,

said needle - folding or tucking blade cylinder (7) having a circumference dimensioned to accept, circumferentially, a plurality of cut products;

a folding jaw cylinder (8) to form a first cross fold of the longitudinally folded, cut products;

a combination needle - cutter blade cylinder (12) operatively associated with the combination needle - folding or tucking blade cylinder (7),

a needle - folding jaw - delivery cylinder (13) having needle rows (23) and folding jaws (22) located between the needle rows, operatively associated with the combination needle - cutter blade cylinder (12); and

wherein the combination needle - cutter blade cylinder (12) additionally includes folding or tucking blades (21) to thereby form a combination needle - cutter blade - tucking blade cylinder (12), the tucking blades (21) being located between adjacent needle rows (16) and cutter blades (18) of said combination needle - cutter blade - tucking blade cylinder (12) for providing an additional fold into the folding jaws (22) of the needle - folding jaw - delivery cylinder (13) and permit delivery of the thus cut and folded products from said needle - folding jaw - delivery cylinder (13).

5,072,920

FINISHER FOR AN IMAGE FORMING APPARATUS

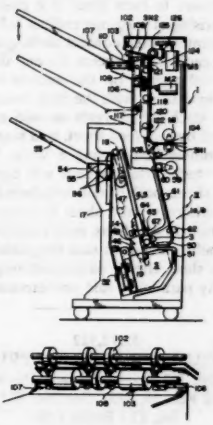
Kazunori Kubota, Yokohama, and Hideo Yamazaki, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 12, 1990, Ser. No. 581,327

Claims priority, application Japan, Sep. 12, 1989, 1-236317; Dec. 27, 1989, 1-341466; Apr. 26, 1990, 2-110980

Int. Cl.[5] B42B *2/00*

U.S. Cl. 270—53 **6 Claims**



1. A finisher for use with an image forming apparatus for stapling paper sheets which are sequentially driven out of said image forming apparatus, comprising:

a receiver for receiving the paper sheets; reference fence means reciprocatingly movable in a predetermined direction to a desired position for positioning the paper sheets on said receiver in an intended direction of paper transport, wherein said reference fence means comprises a pair of reference fences reciprocatingly movable in said predetermined direction symmetrically to each other; and

jogger fence means reciprocatingly movable in said predetermined direction to a desired position independently of said reference fence means for positioning the paper sheets on said receiver in a direction perpendicular to the intended direction of paper transport, wherein said jogger fence means comprises a pair of jogger fences reciprocatingly movable in said predetermined direction symmetrically to each other; and

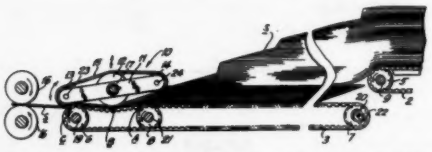
stapling means movable to a predetermined position for stapling the paper sheets positioned on said receiver.

5,072,921

FEEDING MECHANISM

Roman M. Golicz, Clinton, Conn., assignor to GBR Systems Corporation, Chester, Conn.

Continuation of Ser. No. 245,220, Sep. 16, 1988, abandoned, Continuation of Ser. No. 863,372, May 15, 1986, Pat. No. 4,772,004. This application May 23, 1990, Ser. No. 527,303
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.
Int. Cl.[5] B65H 3/04
U.S. Cl. 271—35 18 Claims



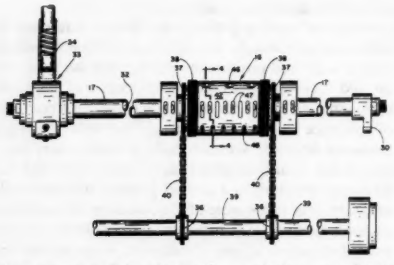
1. A mechanism for feeding sheets from a stack of sheets, each sheet of which has front, rear and a pair of side edges, said stack of sheets having at least one end sheet, comprising feed means and a singulator assembly in operative juxtaposition to said feed means, said feed means feeding sheets from said stack one by one between said singulator assembly and said feed means, said sheets passing between said feed means and said singulator assembly in a linear direction parallel to the side edges of each sheet, said feed means in contact with each sheet as it passes thereby, said singulator assembly in contact with and applying pressure to each sheet as it passes thereby, said feed means comprising at least one endless belt having a wide, flat, planar and uninterrupted contact surface which will come into contact with each of said sheets, the end sheet of said stack bearing against and resting on the endless belt of the feed means, the sheet in contact with the feed means being the said end sheet of the stack which rests on said endless belt, and being the sheet fed by said feed sheet, said singulator assembly comprising an endless belt having a wide, flat, planar and uninterrupted contact surface which will come into contact with each of said sheets both of said belts being oriented in said linear direction whereby each sheet is bowed as each sheet passes between the said two belts, each sheet being on a predetermined plane before it passes said singulator assembly, and the plane of each sheet after it passes said singulator assembly being substantially parallel to said predetermined plane.

5,072,922

VACUUM DRUM FOR PRINTING PRESS FEEDER

Harold E. Paulson, 360 Wynland Trace, Dunwoody, Ga. 30350

Filed Feb. 25, 1991, Ser. No. 661,235
Int. Cl.[5] B65H 3/08
U.S. Cl. 271—99 7 Claims



1. A vacuum applying device for a printing press feeder for applying suction to the lowermost workpiece of a stack of flat workpieces in a hopper for removing the workpieces one at a time from the hopper for feeding to a printing press, said printing press feeder having a reciprocably rotating shaft having a hollow bore for carrying a vacuum, said vacuum applying device comprising:

a cylindrical drum having an axial bore for mounting the drum coaxially to the reciprocably rotating shaft of the printing press feeder for reciprocable rotation therewith;

said drum having a plurality of separate sets of radially extending vacuum outlet ports angularly disposed about the axis of said drum; and

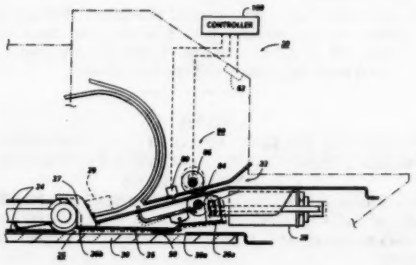
means for selectively providing vacuum communication from the hollow bore of said shaft separately to each set of vacuum outlet ports on said drum to the exclusion of the other sets.

5,072,923

USER-FRIENDLY DOCUMENT INPUT

Gerald L. Coy, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 20, 1990, Ser. No. 569,807
Int. Cl.[5] B65H 7/08
U.S. Cl. 271—110 5 Claims



1. In a document feeder with a document input area into which a document may be manually initially inserted and released, with a document sensor in said document input area for sensing that said manually inserted document has been properly inserted, said document feeder further including automatically releasable gate means against which said manually inserted document is inserted and initially aligned, and clampable feeding nip means defined by feed rollers upstream of said gate means which are initially spaced apart to form an open nip through which said manually inserted document is insertable to engage said gate means, said clampable feeding nip means being automatically actuatable in response to said document sensor document sensing for automatically clamping said manually inserted document in a feeder nip by clamping said open nip of said feed rollers together to form a closed nip, and automatically actuatable means for feeding said document automatically by rotatably driving at least one of said feed rollers, the improvement comprising:

control means providing a preset automatic first time delay period between said sensing of said manually inserted document by said document sensor and said automatic actuation of said clampable feeding nip means,

said control means further providing a preset automatic second time delay period between said automatic actuation of said clampable feeding nip means and said automatic actuation of said means for feeding said document automatically,

and wherein said clampable feeding nip means for automatically clamping said manually inserted document in a closed feeder nip of said feed rollers clamps said document with a limited initial nip force sufficiently low to allow manual document retraction without document damage during said second time delay period,

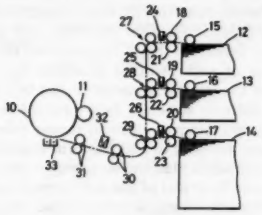
to provide for more user-friendly operator manual insertion of said document.

5,072,924

PAPER FEEDING CONTROL DEVICE

Tsukasa Sugiyama, Moriguchi, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed May 23, 1990, Ser. No. 527,378
Claims priority, application Japan, May 29, 1989, 1-137167; Jun. 2, 1989, 1-141850
Int. Cl.[5] B65H 7/08
U.S. Cl. 271—110 6 Claims



1. A paper feeding control device for feeding paper sheets contained in paper containing sections sheet by sheet to an image processing section, said control device comprising:

a paper feeding means for delivering the paper sheets contained in the paper containing sections,

a registration means disposed near the image processing section on a paper conveying path for arranging a leading edge of a paper sheet to be delivered to the image processing section,

a first paper detecting means for detecting the paper sheet being arranged by the registration means,

a second paper detecting means provided at a downstream position from the paper feeding means and at an upstream position from the first paper detecting means on the paper conveying path, for detecting a leading edge and a rear edge of a paper sheet delivered by the paper feeding means,

a time measuring means for measuring a constant time period t1 corresponding to a predetermined minimum spacing required between paper sheets, and providing a time-up signal at the expiration of the time period t1, and

a paper feeding control means for initiating the time measuring means and for turning on the paper feeding means in response to the detection of the rear edge of one paper sheet by the second paper detecting means, for stopping the paper feeding means once in response to the detection of the leading edge of another paper sheet upstream of said one paper sheet and for resuming operation of the paper feeding means in response to the time-up signal from the time measuring means.

5,072,925

APPARATUS AND METHOD FOR AUTOMATIC REGISTRATION OF MANUALLY INSERTED PRINT MEDIA

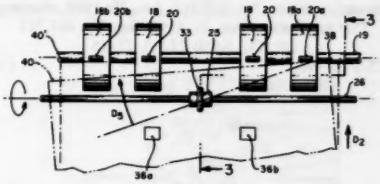
Ronald V. Thiel, Fremont, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed May 9, 1990, Ser. No. 521,279
Int. Cl.[5] B65H 7/02
U.S. Cl. 271—227 18 Claims

1. A registration system for a printer having main drive rollers and drive roller engaging means defining a nip in registration with a print means comprising:

a print media drive roller disposed solely on a shaft in advance of said nip near the center thereof and abutting a print media disposed therein in use; and

a low-torque drive means to rotate said print media drive roller without substantially damaging the integrity of the



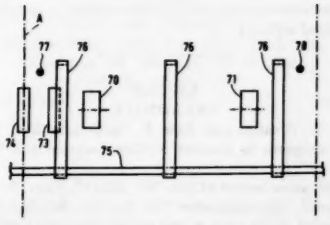
print media when the print media is forced against the nip thereby.

5,072,926

DEVICE FOR CONVEYING AND POSITIONING SHEETS

Hendrikus J. J. Van Soest, Helden, Netherlands, assignor to Oce Nederland B.V., Netherlands

Filed Apr. 12, 1990, Ser. No. 508,956
Claims priority, application Netherlands, Apr. 25, 1989, 8901034
Int. Cl.[5] B65H 9/06
U.S. Cl. 271—236 4 Claims



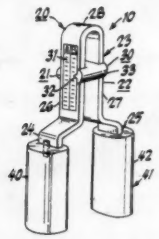
1. A device for conveying sheets in a direction of sheet transport and for positioning said sheets comprising: a conveying means for conveying said sheets; an abutment means extending transversely of the direction of sheet transport; a positioning means for moving said sheets in a direction perpendicular to the direction of sheet transport in order to position one of the longitudinal sides of the sheets on an ideal transport line for said longitudinal side of said sheets, the positioning means being adapted to occupy an operative or inoperative position; and an actuating means for moving the positioning means between said operative position and said inoperative position; wherein said positioning means comprises: a first conveying device and a second conveying device, each said conveying device comprising two conveying members which form a transport nip extending parallel to said ideal transport line, at least one of said conveying members being formed by a roller, the transport nip of said first conveying device extending on and along said ideal transport line and said second conveying device being situated at some distance from said first conveying device within a zone of conveyance for said sheets; and a drive means enabling the roller or rollers of each conveying device to be so driven that each conveying device in its operative position exerts on said sheets a force which is directed towards the other conveying device.

5,072,927

HAND EXERCISE DEVICE

James P. Santos, 223 Rockingstone Ave., Larchmont, N.Y. 10538

Continuation of Ser. No. 369,013, Jun. 20, 1989, abandoned.
This application Dec. 20, 1990, Ser. No. 631,742
Int. Cl.[5] A63B *21/05, 23/16*
U.S. Cl. 272—68 11 Claims



3. A device for exercise of a hand and forearm comprising:

a resilient member adapted so as to enable gasping by a hand, said member resisting compressive forces exerted upon grasping by said hand and, upon release, returning to a starting position,

means for controlling the stiffness of said member so as to achieve a selected resistive force, and

means for adjusting said device so as to accommodate grasping by a hand having a selected size,

said resilient member including tension arms joined at a common end and positioned a selected distance from one another for grasping by a hand,

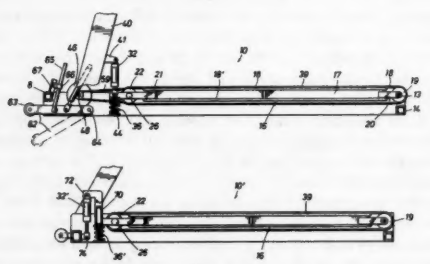
said control means including a translatable fulcrum adapted for movement along said tension arms so as to achieve said selected stiffness.

5,072,928

TREADMILL

Kenneth W. Stearns, and John K. McGee, both of Houston, Tex., assignors to Stearns McGee Incorporated, Houston, Tex.

Continuation-in-part of Ser. No. 125,112, Nov. 25, 1987, abandoned. This application May 1, 1989, Ser. No. 345,631
The portion of the term of this patent subsequent to Jan. 15, 2008, has been disclaimed.
Int. Cl.[5] A63B *22/02*
U.S. Cl. 272—69 7 Claims



1. An exercise treadmill comprising

a base,

a belt system including forward and rear rollers and an endless belt placed about said rollers, said belt having an upwardly exposed operative section,

a belt support platform structure having forward and rear ends, said platform structure at least partially underlying said operative section of said belt and carrying said forward roller of said belt system,

supporting means for pivotally supporting said platform to said base near the rear end,

shock absorbing platform support means including,

spring means for supporting said structure in a rest position when a runner is not on said belt and for storing a portion of the energy imparted to said belt and said belt support platform structure by a runner's foot impacting said belt and returning said belt support platform structure to said rest position as said runner strides from said belt, and

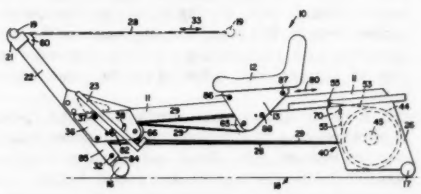
damping element means connected between said front end of said belt support platform structure and said base for providing relatively high damping of the downward movement of said platform structure by dissipating a portion of the energy imparted to said belt and said belt support platform structure by a runner's foot impacting said belt, said damping element means offering substantially lower damping to said platform structure when said spring returns said platform structure to said rest position, wherein said front end of said belt support platform structure moves downward with a damped response when a runner's foot impacts said belt.

5,072,929

DUAL RESISTANCE EXERCISE ROWING MACHINE

Stephen S. Peterson, Maple Grove; Harold C. Blawd, Burnsville; Michael E. Heutmaker, Long Lake; Timothy S. Engel, Bloomington, and Robert A. Iverson, Eden Prairie, all of Minn., assignors to Nordictrack, Inc., Chaska, Minn.

Filed Jun. 13, 1990, Ser. No. 537,898
Int. Cl.[5] A63B *69/06, 21/018*
U.S. Cl. 272—72 10 Claims



1. An exercise apparatus, comprising:

(a) a seat slidably mounted upon an inclined track having a forward end and a rear end, the track being inclined at an angle;

(b) a first flywheel resistance means interconnected to a handle, wherein a user pulling upon said handle applies force against resistance of said first flywheel resistance means;

(c) a second flywheel resistance means interconnected to said seat, wherein a user pushing against a foot plate and said seat applies force against resistance of said second flywheel resistance means;

(d) means for adjusting the resistance of said first and second flywheel resistance means; and

(e) a support column, the support column being affixed to the track and extending between the track and a horizontal support surface, said support column being configured to support said handle, the support column further comprising:

(i) an inner member, the inner member having a first outer dimension, the inner member being formed so as to have a plurality of diametrically opposed orifices passing through the inner member;

(ii) an outer member, the outer member having a second inner dimension, the second inner dimension being greater than the first outer dimension, the outer member being formed so as to have a plurality of diametrically opposed orifices passing through the outer member, the

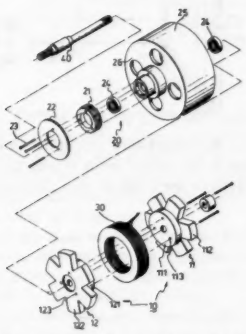
inner member being slidably positionable within the outer member, the inner member being adjustably secured to the outer member by means of at least one shafted fastener passing through at least one pair of aligned orifices on the inner and outer members, thereby establishing a lengthwise dimension of the support column and the angle of inclination of the track;

5,072,930

LOAD APPLYING DEVICE FOR AN EXERCISE BICYCLE

Paul Sun, Taichung Hsien, Taiwan, assignor to Giant Manufacturing Co., Ltd., Tachia Taichung Hsien, Taiwan

Filed Mar. 2, 1990, Ser. No. 488,673
Int. Cl.[5] A63B *21/00*
U.S. Cl. 272—73 **4 Claims**



1. A load applying device for applying a load to an exercise bicycle, said exercise bicycle having a rotating means operated by a user riding on said exercise bicycle, said load applying device comprising:

a fixed main shaft;

an annular exciting coil which creates a magnetic field when a DC current is applied thereto by means of a wire connected thereto;

an electromagnet fixed to said main shaft having a first and a second disk coaxially fixed to said main shaft, serving as a first and a second pole in said magnetic field, each of said first and said second disk having a central projection axially formed thereon which faces toward and engages with the other said central projection to define a positioning shaft, so that said annular exciting coil can be threaded by said positioning shaft and fixed between said first and said second disks;

a rotor rotatably mounted to said main shaft and adapted to be rotated by said rotating means of said exercise bicycle, said rotor being a cup-shaped disk having a flat bottom portion and a circumferential cylindrical wall axially extending from said bottom portion and sleeved around said first pole and said second pole of said electromagnet but not in contact therewith so that said magnetic field is cut parallelly by said cylindrical wall of said rotor when said rotor is rotated by said rotating means of said exercise bicycle, creating an eddy current in said rotor for braking said rotor.

5,072,931

JUMP MEASURING DEVICE

Mylo M. Carlson, Rte. 3, Box 140, Angus, Minn. 56712

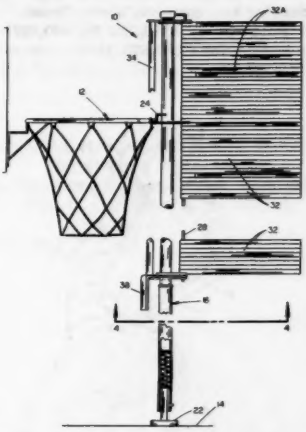
Filed Feb. 28, 1991, Ser. No. 662,424
Int. Cl.[5] A63B *69/00*
U.S. Cl. 272—100 **8 Claims**

1. A jump measuring apparatus for measuring the ability of a person to jump vertically, comprising:

an elongated vertically disposed support means having a lower end in engagement with a floor surface,

means connecting said support means to a basketball rim to stabilize said support means,

a plurality of horizontally disposed and vertically spaced indicator rods pivotally secured to said support means, about a vertical axis, and extending outwardly therefrom,



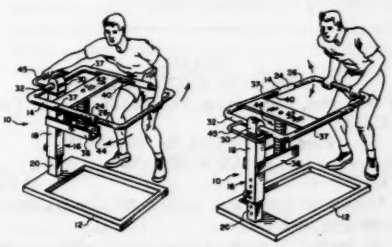
said indicator rods normally being disposed in the same vertical plane but being individually movable with respect to said support means when engaged by the hand of the jumping person using the apparatus.

5,072,932

EXERCISE APPARATUS

John B. Johnson, 2090 Larkin Ave., Elgin, Ill. 60123

Filed Feb. 26, 1991, Ser. No. 661,392
Int. Cl.[5] A63B *21/00*
U.S. Cl. 272—116 **11 Claims**



1. An exercising apparatus comprising:

a planar base member;

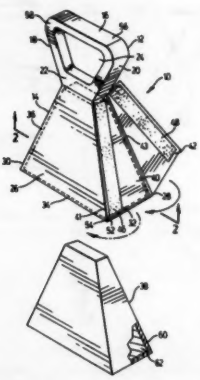
a radial Flange;

a vertical support member extending upwardly from said planar base member;

a downwardly pivotable horizontal planar top member supported by said vertical support member above the planar base member; which includes a slidable panel engaged thereto between lateral peripheries thereof, said panel being slidable toward and away from the vertical support member, said radial flange being attached to said vertical support member, and extending under said top member a substantial distance above the base member wherein said radial flange includes a slide mechanism on a top surface thereof and a tensioning means being slidably engaged to one end thereof to said slide member on said radial flange and at the other end thereof and at the other

end thereof being engaged in a fixed manner to the slidable panel of said top member.

5,072,933
EXERCISING APPARATUS
Joseph Diodati, Sault Ste. Marie, Canada, assignor to Diodatics Internationalinc Inc., Sault Ste. Marie, Canada
Filed Mar. 22, 1990, Ser. No. 497,952
Int. Cl.[5] A63B *21/06*
U.S. Cl. 272—117 **4 Claims**



1. An exercising weight comprising unitary grip and weight portions and a separable weighed unit, the grip portion being at an upper end of the weight portion and including an elongate cross member and side members extending downwardly from the ends of the cross member to the upper end of the weight portion, the weight portion extending outwardly and downwardly from the upper end to a base having a planar lower support surface, the weight portion including a weight supporting outer shell for receiving the separable weighted unit, the weight supporting outer shell further including a door means extending substantially along a side.

5,072,934
MULTIPLE USE EXERCISE DEVICE
Gary W. Blanes, 1755 Langan, Port Coquitlam, B.C., Canada V3C 1K8
Filed Mar. 15, 1991, Ser. No. 669,781
Int. Cl.[5] A63B *21/06*
U.S. Cl. 272—117 **14 Claims**

1. An exercise device adapted for installation in a doorway, comprising in combination:

a first elongate bar having a telescopically adjustable length,

first support means for each end of the first bar, the first support means adapted for attachment on both jambs of the doorway,

first pulley supported at a first position on the first elongate bar,

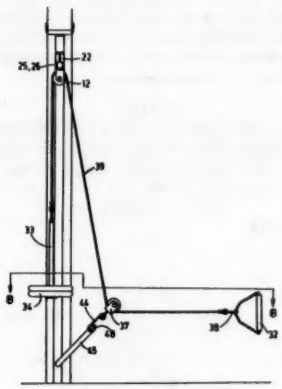
weight plate carrier adapted to hold a plurality of weights,

cable having a gripping handle at one end passing over the first pulley and at the other end connected to the weight plate carrier,

first hook means located at a second position at one end of the first elongate bar,

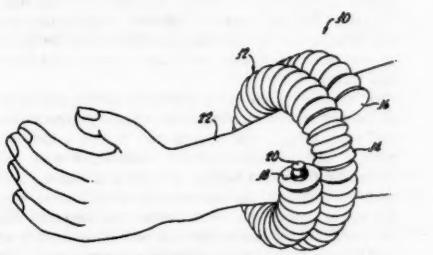
second elongate bar having a telescopically adjustable length and an offset portion adapted to avoid said weight plate carrier when said second bar is installed in said doorway, a second hook means at the approximate center of said second bar,

second support means for each end of the second bar, the second support means adapted for attachment on both jambs of the doorway below the first support means, and



second pulley for detachably mounting on either the first hook means or the second hook means, the second pulley adapted to allow the cable to pass there around.

5,072,935
COLLAPSIBLE THERAPEUTIC WEIGHT SYSTEM
Richard J. McWain, Orange, Calif.
Filed Dec. 19, 1988, Ser. No. 286,222
Int. Cl.[5] A63B *21/065*
U.S. Cl. 272—119 **9 Claims**



1. A collapsible weight system comprising:

diaphragm means for containing a liquid, said diaphragm means including accordion-like wall means for enabling said diaphragm means to be collapsed when not containing the liquid;

means defining a sealable opening in said diaphragm means for enabling the filling and emptying of the diaphragm means with the liquid; and

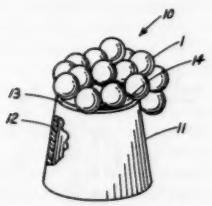
means defining an exterior shape of said diaphragm means for enabling said diaphragm means to be disposed in a position wherein the exterior shape of the diaphragm means encircles a patient's limb without bending of said exterior shape.

5,072,936

MAGNETIC MARBLES STACKING GAME AND APPARATUS

Norwood R. Warehime, 2021 Schuster Rd., Jarrettsville, Md. 21084

Filed Oct. 17, 1989, Ser. No. 422,743
The portion of the term of this patent subsequent to Mar. 17, 2008, has been disclaimed.
Int. Cl.[5] A63F 9/00
U.S. Cl. 273—450 6 Claims



1. Magnetic marbles stacking game and apparatus therefor, for individuals and competing players, comprising:

an upright support structure means used to form an elevated, shallow recessed area with general horizontally orientated surface surface and surrounding rim, suitable for receiving small spherical game pieces;

a plurality of spherical magnetic marbles suitable for use as game pieces, with each of said marbles exerting a magnetic field strong enough to attract and attach to other of said marbles in the immediate vicinity;

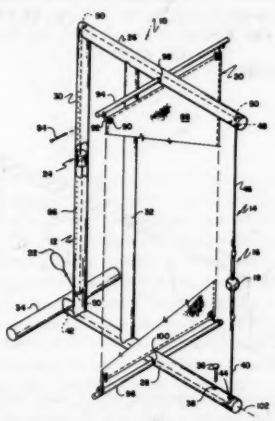
whereby said players, following rules of game play, can compete with other players in a number of game variations in which players take turns in seeing how many of said marbles they can stack onto and above said recessed area of said support structure means before a fall of any of said marbles from said stack arrangement occurs, with player stacking the most of said marbles before said fall occurs being winner.

5,072,937

BASEBALL BATTING PRACTICE DEVICE

Rene A. Zarate, Alice, Tex., assignor to South Texas Sports Manufacturing, Inc., Alice, Tex.

Filed Jan. 11, 1991, Ser. No. 640,154
Int. Cl.[5] A63B 69/00
U.S. Cl. 273—26 E 12 Claims



1. A baseball batting practice device comprising

a support having a vertical section and first and second horizontal vertically spaced members;

a baseball target;

a suspension means suspending the target between the horizontal members, said suspension means including

an elongate elastic section having

a first end affixed to the support, and

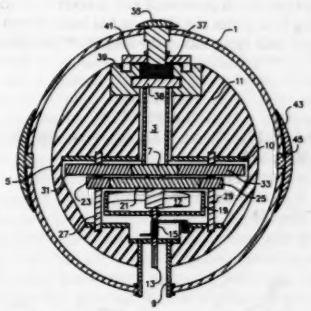
a second end attached to one end of an elongate inelastic section, said inelastic section having a handle at its other end for pulling on the elastic section for moving the target away from the first horizontal member and thereby stressing the elastic section.

5,072,938

GAME BALL HAVING INTERNAL ROTATION IMPARTING MECHANISM

Yong Shin, 9322 12th Ave. East, Tacoma, Wash. 98445

Filed Nov. 6, 1989, Ser. No. 432,176
Int. Cl.[5] A63B 67/00
U.S. Cl. 273—58 F 22 Claims



1. A game ball lacking substantial vibratory motion when in flight, said game ball comprising:

a substantially spherical shell;

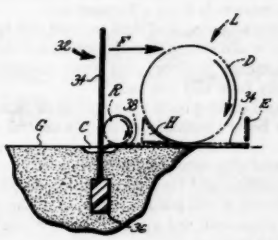
a drive means fixedly attached to, and within said shell for causing rotation of said shell about an axis intersecting the geometric center of said game ball and with respect to a portion of said drive means that provides an inertial mass which rotates about the axis in an opposite direction to that of said shell, said game ball having a center of mass mainly coinciding with the axis.

5,072,940

GOLF COURSE FAIRWAY INCLUDING DISTANCE MARKER

John M. Bailey, 1249 Golfside Dr., Sebring, Fla. 33870

Continuation-in-part of Ser. No. 570,731, Sep. 24, 1990, abandoned. This application Mar. 20, 1991, Ser. No. 672,174
Int. Cl.[5] A63B 69/36; G09F 7/22; E01F 9/02
U.S. Cl. 273—176 A 3 Claims



1. A visual distance marker which is implanted in an elongated fairway of a golf course and is unaffected by the opera-

tion of a reel-type lawn mower passing thereover said marker comprising:

a very thin, flat, generally straight flexible upstanding marker strip having an upper distal end and a lower end and a uniform generally rectangular cross section along substantially its entire length;

said marker strip lower end connected to an enlarged anchor portion, said anchor portion completely embedded into a grassy area of the golf course fairway;

said upper end extending above ground a distance such that said strip may be instantly depressed by the leading edge bar of the lawn mower and said strip will be sequentially depressed by the mower and following bar of said mower, so that said strip will not be severed when said grassy area of said fairway is being mowed in a direction lengthwise of said fairway;

said strip marker being oriented in the fairway so that its width or greatest transverse dimension faces the direction of the tee associated with said fairway, and being sufficiently resilient to return to its original straight and upstanding orientation thereafter;

indicia on the width portion of said marker strip for communicating to a golfer the distance has been driven from said tees golf ball lying along the length of the fairway.

5,072,941

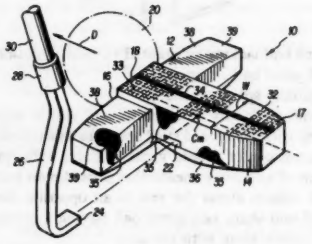
GOLF PUTTER

Robert Klein, 1177 Bazett Rd., Kelowna, British Columbia, Canada V1Z 2T4

Filed Feb. 27, 1990, Ser. No. 485,501

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—164 **19 Claims**



1. A golf club comprising:

a shaft;

a club head, said club head having an upper and bottom surface, a forward and a rear end, and a heel and opposing toe side; wherein said club head comprises an elongated striking body extending longitudinally from the heel to the toe side of said club head and said striking body has a ball striking face on a forward end thereof, and an elongated alignment platform extending rearwardly from said striking body substantially perpendicularly to said ball striking face such that said striking body and said alignment platform substantially form a T-shape; and

a stem interconnecting said shaft and said club head, wherein one end of said stem is directly attached to the heel side of the alignment platform, said stem extending generally upwardly from said one end;

wherein said striking body has a bottom surface, said bottom surface being substantially flat in a central area thereof; and

wherein said alignment platform has a bottom surface and an upper surface, said bottom surface of said alignment platform having a first portion rearward of the striking body that is concaved, and a second portion rearward of said concaved portion; and

wherein said second portion and said substantially flat central area of the bottom surface of said striking body lie in a plane which is substantially parallel to the upper surface of the alignment platform.

5,072,942

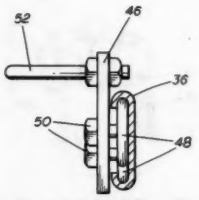
GOLF SWING TRAINING DEVICE

Dale P. Hurley, Galveston, Tex., assignor to Swing Right Manufacturing Inc., Alvin, Tex.

Filed Sep. 21, 1990, Ser. No. 586,412

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—191 A **6 Claims**



1. A training apparatus to improve the stroke of a golf club, comprising

a continuous, circular shaped track comprising a channel having radially inner and outer opposed portions each curved inwardly to the other and separated by an intermediate flat portion,

a base mounting said track,

a carriage movable along said track and mounting at least three longitudinally spaced wheels, each on an axial mount adapted for normal disposition to said flat portion, one wheel being radially spaced from at least two other wheels, said wheels being positioned to roll longitudinally within said curved portions of said channel, said radial wheel spacing positioning at least one wheel to roll along said outer inwardly curved portion and positioning at least one other wheel to roll along said inwardly curved portion, said mounting wheels securing said carriage in said channel for guided movement along said circular track, and

retention means on said carriage to retain said club on said carriage in a manner allowing radial movement relative to said track between said club and said carriage.

5,072,943

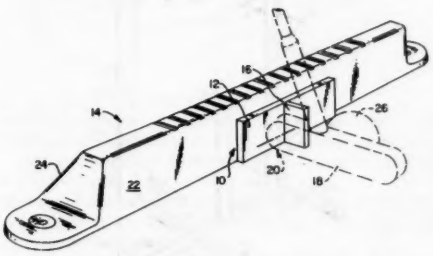
PUTTER STABILIZING AND GUIDING SYSTEM

Joseph L. Sindelar, 2121 Hancock Dr., Horseheads, N.Y. 14845

Continuation-in-part of Ser. No. 540,350, Jun. 19, 1990, Pat. No. 5,024,442. This application Dec. 7, 1990, Ser. No. 624,224

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—192 **14 Claims**



1. A golf club in combination with a putter stabilizer;

said golf club having a shaft, a golf club head defined at a first end of said shaft and a handle defined at a second end of said shaft, said golf club head having a longitudinal axis, a toe portion at one end of said longitudinal axis and a heel

portion at the other end of said longitudinal axis, a forward face and rearward face;

said putter stabilizer being detachably, adjustably coupled to said golf club head, said putter stabilizer comprising a substantially planer base portion having a first end, a second end, and a longitudinal axis, and a substantially planer connector portion having a first end, a second end, and a longitudinal axis, said base portion having a length substantially greater than a thickness of said golf club head, said first end of said connector portion being connected to said base portion so that a plane of said connector portion is substantially perpendicular to the plane of said base portion, said connector portion being detachably and adjustably coupled to one of said toe portion and said heel portion so that said plane of said connector portion is parallel to one of said forward face and said rearward face and so that the longitudinal axis of said golf club head intersects said plane of said base portion;

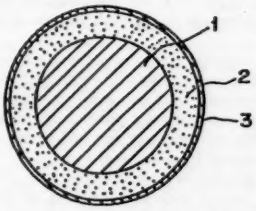
whereby said planer base portion presents a planer face for sliding engagement with a planer surface disposed adjacent one of the toe and the heel of the putter and whereby the forward face of said golf club head can be maintained square with respect to the planer surface and a corresponding stroke direction.

5,072,944

THREE-PIECE SOLID GOLF BALL

Akihiro Nakahara, Ibaraki; Mikio Yamada, Kobe; Tadahiro Ebisuno; Takashi Sasaki, both of Nishinomiya, and Kengo Oka, Kobe, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Apr. 4, 1990, Ser. No. 504,675
Claims priority, application Japan, Apr. 4, 1989, 1-86110
Int. Cl.[5] A63B *37/12*
U.S. Cl. 273—220 **4 Claims**



1. A large size three piece solid golf ball comprising a center core, an outer layer covering said center core to form a solid core and a cover covering said solid core, wherein said center has a diameter of 15 to 24 mm and a center hardness of 25 to 50 (JIS-C), prepared from a rubber composition comprising 100 parts by weight of cis-1,4-polybutadiene, 9 to 20 parts by weight of zinc acrylate and 3 to 150 parts by weight of zinc oxide, said solid core has a diameter of 36 to 40 mm and a surface hardness of 70 to 90 (JIS-C), a difference between the center hardness and the surface hardness of the solid core is 20 or more and the specific gravity of the center core and the outer layer has the following relation;

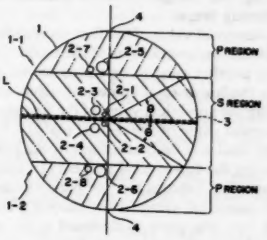
a specific gravity of the center core ≧specific gravity of the outer layer, and the specific gravity of the center core ≧1.1.

5,072,945

GOLF BALL

Kengo Oka, Kobe, and Yoshikazu Yabuki, Akashi, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Sep. 12, 1990, Ser. No. 581,547
Claims priority, application Japan, Jul. 2, 1990, 2-175970
Int. Cl.[5] A63B *37/12*
U.S. Cl. 273—232 **4 Claims**



1. A golf ball comprising,

a spherical surface, said surface having a great circle zone, a first and a second pole, said poles being formed by the intersection with said surface of a first axis passing through the center of the ball, and a parting line, said parting line being formed by the intersection of a plane passing through the center of the ball, said being perpendicular to said first axis and equidistant between said first and second poles, and being divided into an S region and a P region by a central angle of the sphere, said angle being measured from said plane toward said first axis and being less than 60° , said S region extending away from said parting line toward each said poles and said P region having a first portion and a second portion, said first portion extending from said first pole to said S region, said second portion extending from said second pole to said S region, said S region having a plurality of kinds of dimples SD_n, each of said plurality of kinds of S region dimples differing in curvature from every other of said plurality of kinds of S region dimples, said plurality of kinds of S region dimples being symmetrically arranged in relation to said parting line, wherein each of said plurality of kinds of S region dimples has a volume VSD_n, said P region having a plurality of kinds of P region dimples, PD_n, each of said plurality of P region dimples differing in curvature from every other of said plurality of kinds of P region dimples, said plurality of kinds of P region dimples being symmetrically arranged in relation to said parting line, wherein each of said plurality of kinds of P region dimples has a volume of VPD_n, and wherein at least one of said plurality of kinds of S region dimples has a corresponding one of said plurality of kinds of P region dimples having an equal curvature, the value of VSD_n/VPD_n for each pair of corresponding dimples being set as $1.02 \leqq VS/VP \leqq 1.25$.

5,072,946

METHOD OF PLAYING A WAGERING CASINO-TYPE CARD GAME

Mark M. Miller, Las Vegas, Nev., assignor to Yin Yang Yo, Inc., Las Vegas, Nev.

Filed Aug. 30, 1990, Ser. No. 575,329
Int. Cl.[5] A63F *1/00*
U.S. Cl. 273—292 **36 Claims**

26. A method of playing a casino-type game utilizing at least one deck of cards, each card having a numerical value assigned thereto, comprising:

a) a bettor wagering on whether a first player will win, whether a second player will win, or whether the game will end in a tie,

b) dealing a card to the first player and determining the numerical value of that card, the card comprising the first player's hand,

c) dealing another card to the second player and determining the numerical value of that card, the card comprising the second player's hand,

d) comparing the numerical value of the first player's hand to the numerical value of the second player's hand,

1) if the numerical value of the first player's hand is the same as the numerical value of the second player's hand, declaring that the game ends in a tie and that the tie is the winning bet, or

2) if the numerical value of the first player's hand is not the same as the numerical value of the second player's hand, dealing another card to be added to the player's hand having the lower total numerical value, and

e) comparing the numerical value of the first player's hand to the numerical value of the second player's hand and continuing to deal one card at a time to the player with the hand having the lower total numerical value until

1) the numerical value of the first player's hand is the same as the numerical value of the second player's hand, in which case the game is declared a tie, and the tie is declared to be the winning bet or

2) when the total numerical value one of the player's hands exceeds a predetermined numerical value, declaring the player with the hand having the lower total numerical value to be the winner, and

f) paying the bettor a preselected amount if the bettor has bet on the winning player or has bet that the hand will end in a tie.

5,072,947

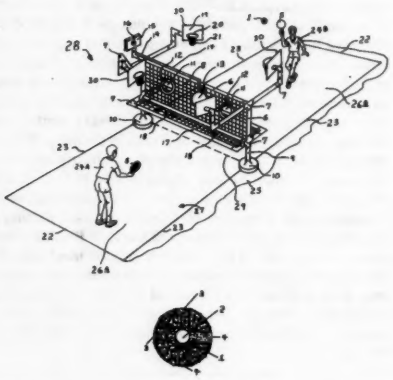
RACQUET GAME WITH AIR BALL THEREOF

John D. Blue, 605 Hama Dr., Holiday, Fla. 34691

Filed Nov. 23, 1990, Ser. No. 617,138

Int. Cl.[5] F41J *5/04;* **A63B** *37/06, 61/00, 63/08*

U.S. Cl. 273—371 **5 Claims**



1. A competitive recreational ball game assembly in which opposed players return a ball within a prescribed court extending along a horizontal playing surface in opposite longitudinal directions from an apparatus located on the playing surface between the players such that the court is divided into first and second opposed playing areas with the apparatus placed therebetween, the ball game assembly comprising in combination:

at least one game ball;

at least one ball striking instrument;

and an apparatus, said apparatus comprising:

a frame having a first horizontal supporting means for supporting a net in a horizontal position, a second vertical supporting means connected to said horizontal supporting means for supporting another net in a vertical position above said horizontal net wherein the horizontal and vertical nets form right angles on either side of said vertical net, a plurality of target holes in said vertical net, each hole dimensioned for said ball, driven by said striking instrument, to pass therethrough, a plurality of supporting stands, each stand connected to and extending downwardly form an opposite lateral edge of said horizontal supporting means for supporting said apparatus on a playing surface, a plurality of third supporting means each connected to said vertical supporting means, each third supporting means supporting a basketball backboard, hoop and net assembly, said hoop and net dimensioned for said ball, driven by said striking instrument, to pass therethrough, each basketball assembly positioned on opposite sides of said vertical net and above said horizontal net.

5,072,948

SEAL ASSEMBLY FOR A HIGH SPEED MACHINING SYSTEM

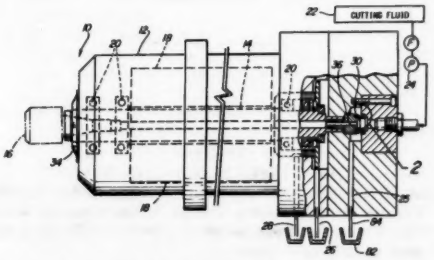
Richard A. Kostrzewski, Findlay, Ohio, assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 398,877, Aug. 28, 1989, abandoned.

This application Mar. 6, 1991, Ser. No. 665,852

Int. Cl.[5] F16J *15/40;* **B23B** *51/06*

U.S. Cl. 277—2 **17 Claims**



1. A seal assembly for preventing leakage of liquid cutting coolant in a high speed machining system from a shaft rotatable at high speeds, the shaft having a hollow passage extending longitudinally therethrough, the liquid flowing at high pressure and volume through said passage and past a machine tool mounted on the shaft, the seal assembly including:

a seat ring mounted on the shaft and being rotatable therewith;

an annular face seal axially movable in relation to the shaft, but fixed against rotation therewith, said annular face seal being engageable with said seat ring and being configured with a reduced diameter portion where said face seal is engageable with said seat ring and an increased diameter portion spaced from said seat ring;

annular means for urging said annular face seal against and in annular contact with said seat ring to form an annular primary seal, said means for urging being loaded adjacent said annular face seal;

a housing having an axial bore extending toward said seat ring;

an annular retainer having an outer cylindrical wall extending along part of said bore, and an inner cylindrical wall extending within said annular face seal, said annular retainer supporting said means for urging;

first means for sealing positioned between the increased diameter portion of said annular face seal and said annular retainer to form a secondary seal and defining with said annular face seal a cavity in communication with the liquid cutting coolant for exposing said reduced diameter portion to the high pressure of said coolant, said first sealing means suppressing the leakage of liquid between said annular face seal and said annular retainer; and

second means for sealing positioned between said annular retainer and said bore to form a tertiary seal, said second sealing means suppressing the leakage of liquid therebetween,

whereby said annular primary seal, said secondary and said tertiary seals cooperate to substantially eliminate leakage of liquid outside the seal assembly and to augment said annular means for urging said annular face seal against said seat ring while the shaft rotates at high speed and when the liquid flows at sufficiently high pressures and volumes to remove machining debris and to cool the system and while the coolant is communicating with said cavity.

5,072,949

LIQUID-FLUSHED SEAL FOR ROTATING SHAFT WITH VACUUM PROVIDING LEAKAGE CONTROLLING CHOKE IN FLUSHING LIQUID SUPPLY CONDUIT

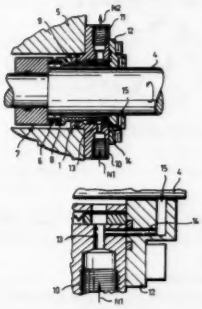
Esko Lopperi, Jyväskylä , Finland, assignor to Safematic Ltd., Muurame, Finland

Continuation of Ser. No. 407,197, Sep. 14, 1989, abandoned. This application Jan. 15, 1991, Ser. No. 642,696

Claims priority, application Finland, Dec. 21, 1988, 885925

Int. Cl.[5] F16J *15/34, 15/40*

U.S. Cl. 277—3 **1 Claim**



1. In a seal arrangement for a mechanical assembly which includes a rotary shaft circumferentially surrounded by a stationary body, the rotary shaft having a rotary slide ring disposed in sliding sealing engagement with a static slide ring provided on said stationary body, a secondary seal circumferentially surrounding the rotary shaft at a site that is axially spaced from said slide rings, said secondary seal being slightly radially spaced from said shaft so as to provide an annular gap defining an annular path of possible leakage axially past said secondary seal, the rotary shaft and the stationary body including surface means defining radially between them a flushing liquid chamber which is delimited at one end by said secondary seal, means spacing said slide rings from said rotary shaft so that slidingly engaging faces of said slide rings are operatively exposed to said chamber, means defining a flushing liquid line intersecting said flushing liquid chamber and including a flushing liquid supply conduit to said flushing liquid chamber and a flushing liquid discharge conduit from said chamber, wherein, in use, as said rotary shaft is rotating, and flushing liquid is being supplied to said flushing liquid chamber through said supply conduit and thereby lubricating said engaging faces of said slide rings, and being discharged from said flushing liquid chamber through said discharge conduit, some of the flushing liquid will tend to leak out of said flushing chamber through said annular gap between said secondary seal and said rotary shaft,

an improvement for reducing such flushing liquid leakage, comprising:

said supply conduit having a throttling choke upstream of said flushing liquid chamber; and

a suction conduit communicating between said annular gap and said choke, remote from said flushing liquid chamber, so that, in use, the flow of flushing liquid through said flushing liquid supply conduit into said flushing liquid chamber, due to temporarily increased velocity while flowing axially through said choke, creates a partial vacuum in said suction conduit and thereby draws into said flushing liquid supply conduit and forwards into said flushing liquid chamber flushing liquid which previously has leaked from said flushing liquid chamber into said annular gap.

5,072,950

VALVE STEM ASSEMBLY

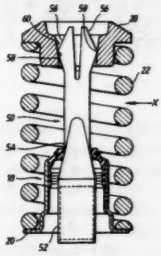
Antony Littleproud, Mid Glamorgan, and David Hill, South Glamorgan, both of Wales, assignors to Seal Technology Systems, Cardiff, Wales

Filed Aug. 24, 1990, Ser. No. 573,567

Claims priority, application United Kingdom, Aug. 25, 1989, 8919398

Int. Cl.[5] F16J *15/32;* **F01L** *3/08;* **B23P** *19/04*

U.S. Cl. 277—9.5 **3 Claims**



1. A valve stem seal assembly comprising:

a valve stem seal having an external flange and a sealing lip;

a washer having a tapered axial bore;

a spring extending between the external flange of the seal and the washer; and

a member engaging the seal and the washer and holding the seal, spring and washer together;

the member having a lower tubular portion, an intermediate conical portion engaged by the sealing lip of the valve stem seal, and flexible fingers at its upper end in engagement with the tapered axial bore in the washer.

5,072,951

PRESSURE BALANCED MECHANICAL SEAL ASSEMBLY WITH ENCAPSULATED DOUBLE-DISK SPRING BIASSING ELEMENT

Raymond W. Hinks, Transvaal, South Africa, assignor to Terratech Mining Services (PTY) Ltd., Transvaal, South Africa

Continuation of 423,207, Oct. 27, 1989, now U.S. Pat. No. 5,011,164

Filed Nov. 6, 1990, Ser. No. 609,606

Claims priority, application South Africa, Oct. 18, 1988, 88/7762

Int. Cl.[5] F16J *15/34*

U.S. Cl. 277—40 **4 Claims**

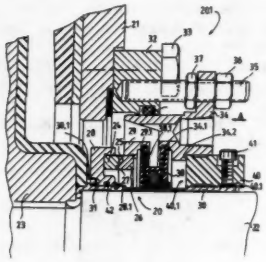
1. A mechanical seal arrangement for use in association with a pump casing structure and a drive shaft for driving a pump impeller which is housed in the pump casing structure, the seal arrangement comprising:

a rotatable seal ring having a seal face mountable concentrically on the drive shaft for rotation with the drive shaft;

a non-rotatable seal ring having a seal face mountable in axial alignment with the rotatable seal ring; and

biasing means for providing a biasing force to urge the rotatable and non-rotatable seal rings axially toward each

other for effecting a seal between the seal faces of the respective seal rings, the biasing means comprising first and second disc spring elements arranged in series such that outer peripheries of the spring elements are axially spaced, the disc spring elements being encapsulated in an elastomeric body, the biasing means being received in compression between the non-rotatable seal ring and the pump casing structure such that the first disc spring element is proximate to the non-rotatable seal ring and the second disc spring element is proximate to the pump casing structure, and such that a radially outer periphery of the biasing means is exposed in use to high pressure in the pump casing, the biasing means being sealed at either side at positions towards its radially outer periphery



against respectively the non-rotatable seal ring and the pump casing structure, the elastomeric body being formed to have a peripheral groove in its radially outer periphery between the disc spring elements, the groove being radially outwardly open to be exposed to high pressure in use and having opposed annular sides extending generally along respective radially outwardly annular side portions of the disc spring elements, the side proximate the first disc spring element being of predetermined radial depth such that the annular side of the groove has an annular projected area of predetermined size to allow hydraulic closing forces acting on that surface to be of the same magnitude as hydraulic opening forces acting in the opposite direction between the seal faces.

5,072,952

SEALING ELEMENT

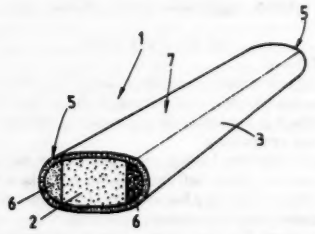
Fritz Irrgeher, Leverkusen-Hitdorf, and Werner Frank, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Irbit Research & Consulting AG, Fribourg, Switzerland

Continuation of Ser. No. 293,516, Jan. 4, 1989, abandoned. This application Oct. 5, 1990, Ser. No. 595,627

Claims priority, application Fed. Rep. of Germany, Jan. 4, 1988, 8800023[U]

Int. Cl.[5] F16J *15/10*

U.S. Cl. 277—229 **15 Claims**



1. An expandable sealing element adapted to be held in a compressed condition and respectively to be released for expansion, comprising

an impregnated foam element having delayed elastic expansion due to impregnation of the foam element with a material having adhesive action, and

an expandable cover covering the foam element, and wherein

the cover defines an opening region by which the foam element is exposed for entrance of air, whereby the foam element elastically expands with delay solely by the entrance of the air through the opening region into pores of the foam element, without heating being required, when released from the compressed condition.

5,072,953

PIPE CENTERING DEVICE

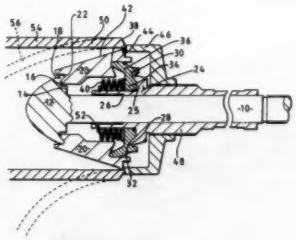
Raymond P. Griffiths, 6 Beechwood Avenue, Melton Mowbray, Leicester., Leicestershire, England

Filed Sep. 4, 1990, Ser. No. 577,304

Claims priority, application United Kingdom, Sep. 15, 1989, 8920984

Int. Cl.[5] B23B *31/40*

U.S. Cl. 279—2 R **7 Claims**



1. A mechanism for mounting a generally circular, hollow member such as a pipe coaxial with a machine tool, the mechanism comprising:

an elongate support means;

a generally conically shaped, segmented member coaxially supported by said support member;

coupling means coupling said segmented member to said support means, said coupling means being supported on said support means for axial movement relative thereto whereby said relative axial movement of the coupling means and said support means causes expansion or contraction of said segmented member between first, expanded and second, contracted extreme positions radially of said support means;

and wherein said segmented member is provided on its radially outer surface at or adjacent its rear end with a friction surface in the form of a radiussed ridge for bearing against an inner surface of said pipe for securing said pipe coaxial with said mechanism.

5,072,954

DRILL CHUCK WITH POSITION INDICATOR

Hans-Dieter Mack, Sontheim, Fed. Rep. of Germany, assignor to Günter H. Röhm, Sontheim, Fed. Rep. of Germany

Filed Dec. 7, 1990, Ser. No. 625,678

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1989, 3940587.7

Int. Cl.[5] B23B *31/02*

U.S. Cl. 279—60 **12 Claims**

1. A drill chuck comprising:

a chuck body centered on and rotatable about an axis;

an adjustment body rotatable about the axis on the body;

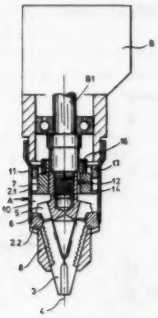
jaws spaced about the axis between the bodies;

means including screwthread formations coupling the bodies

with the jaws for axial forward movement of the jaws on rotation of the adjustment body on the chuck body in one direction and opposite axial backward movement on opposite relative rotation of the bodies;

an indicator element between the chuck and adjustment bodies; and

means including



a screwthread coupling centered on the axis between the element and a one of the bodies, and

a translatory coupling between the element and the other of the bodies,

for straight-line movement of the indicator element relative to the other body on relative rotation of the bodies.

5,072,955

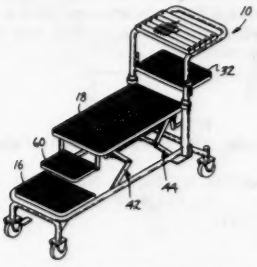
MECHANIC'S HELPER AND STEP PLATFORM

John C. Holland, Denbury House, P.O. Box 220, Bailey, Colo. 80421, and Joe L. Coppedge, Sr., 3650 S. Federal Blvd., #124, Englewood, Colo. 80110

Filed Aug. 10, 1990, Ser. No. 565,131

Int. Cl.[5] A01D *67/04*

U.S. Cl. 280—32.5 **1 Claim**



1. A new and improved work supporting cart comprising:

a frame member;

a plurality of sheet members secured to said frame member and being operable to effect a selective movement and positioning of said frame means relative to a ground surface;

first work supporting platform fixedly secured to said frame member;

and

second work supporting platform means fixedly adjustably secured to said frame and being movable relative thereto and to said first work supporting platform for effecting a selective positioning at said second work supporting platform relative to said first work supporting platform,

and

further including a handle means removably attached to said frame member, said handle means being removable to permit a positioning of said work supporting cart beneath a chosen structure,

and

including a tool tray attached to a topmost portion of said handle means and projecting beyond said frame member,

and

including a third work supporting platform pivotally fixedly attached to said second work supporting platform means adjacent said first work supporting platform, said third work supporting platform comprising a folding step assembly movable into a position to function as a step when said second work supporting platform means is in a second position spaced above said first work supporting platform from a first lowered position adjacent said first work supporting platform to facilitate a desired positioning of said first, second and third work supporting platform means in a step-like manner to facilitate their concurrent use as a ladder,

and

said tool tray attached to said handle means forming a part of said work supporting cart, said tool tray being selectively removable from said cart to facilitate a selective attachment of said tool tray platform means to a vehicle,

and

said tool tray spaced above said first work supporting platform and including a plurality of hook members selectively securable to the tool tray spaced above a top surface of said tool tray for securement to a vehicle's bumper to facilitate its use as a step.

5,072,956

POWERED DISPLAY FOR SHOPPING CART

John M. Tannehill, 2890 Lansdowne Road, Victoria, B.C. V8R 3P9, Canada, and John B. Tannehill, 507 Briarwood Dr., Apt. 8C, Enterprise, Ala. 36330

Continuation-in-part of Ser. No. 385,852, Jul. 26, 1989, Pat. No. 4,930,795. This application May 4, 1990, Ser. No. 519,211

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.[5] B62D *39/00*

U.S. Cl. 280—33.992 **14 Claims**

1. An apparatus for displaying visual matter on a wheeled shopping cart manually propellable by an individual, the cart having a storage bin section, a frame, and wheels mounted on the frame for rolling movement of the cart during manual propelment, the apparatus comprising:

(a) an electronic display apparatus mounted on the shopping cart for displaying visual information thereon in an orientation to enable the visual information to be viewed as the cart is being manually propelled; and,

(b) power transmission means for supplying electrical power to the electronic display apparatus by manual propelment of the shopping cart, the power transmission means comprising:

drive train means;

first coupling means coupled to one of the wheels of the shopping cart to transmit torque from the wheel to the

drive train means in a first rotational direction during propelment of the shopping cart in the forward direction;

second coupling means operably connected to the electronic display apparatus to transmit power from the drive train means to the electronic display apparatus to power the electronic display apparatus; and,

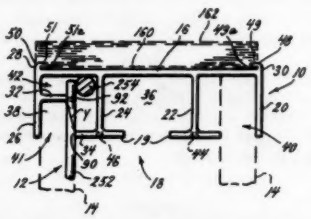
whereby upon manual propelment of the shopping cart by the individual in the forward direction the electronic display is powered by at least one wheel of the shopping cart.

5,072,957

SHOPPING CART ACCESSORY

William F. Graebe, Jr., 208 Yorktown Dr., Collinsville, Ill. 62234

Filed Feb. 24, 1988, Ser. No. 159,771
Int. Cl.[5] B62B 5/00
U.S. Cl. 280—33.992 **12 Claims**



1. A substantially rigid shopping cart accessory for a shopping cart having generally upright side wall portions and at least one top rim rod, comprising:

(a) a work area for use by a shopper with respect to a shopping trip;

(b) a generally horizontal supporting member for abutting engagement with a generally upright portion of a shopping cart and providing supporting abutment below the top rim rod and against the generally upright side wall portion of the shopping cart, the one generally horizontal supporting member connected to the work area and substantially proximate a side wall portion, whereby the generally horizontal support member tends to resist any rotational torque effect due to a moment arm resulting from a cantilever support of the accessory mounted on the cart side wall; and

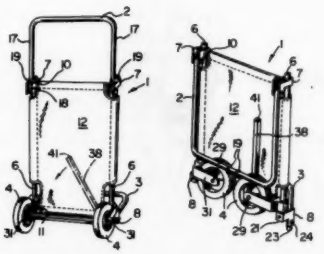
(c) another generally horizontal supporting member for abutting engagement with the generally upright side wall portion of the shopping cart and providing opposing supporting abutment at a position below the top rim rod and further below the other generally horizontal member against the generally upright side wall portion of the shopping cart, the one and the other supporting members of the accessory spaced apart generally horizontally a first distance equal to or greater than the width of the generally upright side wall portion of the shopping cart, and generally vertically a second distance equal to or greater than the combined width of the generally upright portion of the shopping cart and any additional cart structure received thereby that must be passed between the one and the other supporting member in order to removably attach the shopping cart accessory to the shopping cart while maintaining the shopping cart accessory work area in a relatively perpendicular relationship with the vertical side wall, independent of whether the shopping cart accessory is mounted inside or outside a basket portion of the shopping cart, the other supporting member connected to the work area, whereby, the reaction resulting from the cantilever between the supporting members and received portion of the shopping cart provide support for the cantilevered weight of the shopping cart accessory and thereby restrain the shopping cart accessory removably in place on the generally upright side wall portion of the shopping cart.

5,072,958

HAND TRUCK

Horace J. Young, 2603, 1100 - 8 Avenue SW., Calgary, Alberta, Canada T2P 3T9

Filed Feb. 19, 1991, Ser. No. 656,760
Int. Cl.[5] B62B 1/04
U.S. Cl. 280—40 **10 Claims**



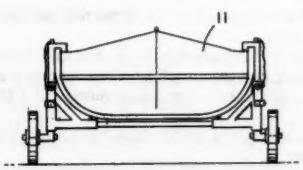
1. A collapsible hand truck comprising skeletal frame means, said frame means including parallel sides, upper bracket means on a top of each side, lower bracket means on a bottom of each side, and top end means connected with and extending between said upper bracket means; handle means rotatable connected on said top bracket means for rotation to a use position above said frame means; platform means for carrying a load and rotatably connected on said lower bracket means for movement between a storage position against said frame means and a use position perpendicular to said frame means; yoke means pivotally mounted on each said side for rotation between a storage position parallel to said frame means and a use position perpendicular to said frame means; wheel means carried by each said yoke means; and crossbar means pivotally connected to one said yoke means for rotation between a horizontal use position in engagement against the other said yoke means for maintaining the wheel means parallel in the use position, and a raised, folded position permitting rotation of said yoke means and wheel means towards each other to the collapsed, storage position.

5,072,959

BOAT CARRIER

Gaetano C. Marullo, 1752 Nanton St., NW., Palm Bay, Fla. 32907

Filed Nov. 9, 1990, Ser. No. 611,041
Int. Cl.[5] B60P 3/10
U.S. Cl. 280—47.331 **3 Claims**



1. A boat carrier for securing and transporting a boat having a hull, the boat carrier comprising;

a pair of hold down brackets, each bracket having a hook, each hook having an upper surface, each upper surface having a vertically extending projection,

a pair of corner braces, each corner brace having a vertical portion and a horizontal portion, each portion having

walls, each corner brace connected to each corresponding hold down bracket,

a pair of wheel assemblies, each wheel assembly including at least one wheel, each wheel assembly connected to each respective corner brace,

a lateral support bar, said lateral support bar having a first end and a second end, each end connected to each respective corner brace.

a pair of cord clamps, each clamp pivotally mounted to each vertical portion of each corner brace, each cord clamp having a receiver, each cord clamp having a first position and a second locking position, and

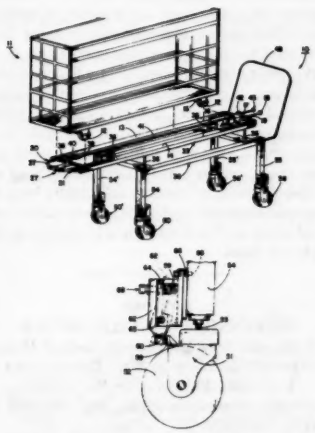
a pair of rope loops, each loop having a first end and a second end, each loop having said first end held by said respected receiver and said second end wound around said projection, whereby pivoting each cord clamp from said first position to said second position secures each hold down bracket to each respective corner brace and secures said boat hull to said carrier.

5,072,960

STERILIZER CART

Walter J. Sperko, Greensboro, N.C., assignor to Sterilizer Technologies Corporation, Kernersville, N.C.

Filed Feb. 15, 1990, Ser. No. 480,231
Int. Cl.[5] B62B *5/00, 3/04;* B60B *33/02*
U.S. Cl. 280—47.34 **6 Claims**



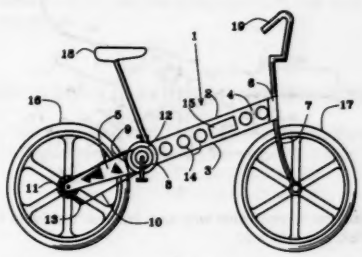
1. A cart comprising: a frame, a pair of rails mounted on said frame, a movable caster assembly joined to said frame, said caster assembly comprising a substantially linear laterally extending detent member, said detent member comprising a pair of arcuate ends, said arcuate ends extending rearwardly from said detent member, means to guide said caster assembly, a resilient member interconnected between a frame housing and said guide means for applying tension to said guide means, said detent member joined to said caster assembly, said detent member providing for said movement along said guide means, said arcuate ends for terminating movement of said detent member, and said guide means for receiving an increasing force as said arcuate ends of said detent member approach said guide means.

5,072,961

BICYCLE WITH UNIVERSAL ADJUSTABLE FRAME

Dennis P. Huppe, 833 SE. 17th St., Ocala, Fla. 32670

Filed Jul. 9, 1990, Ser. No. 550,037
Int. Cl.[5] B62K *17/00, 21/12;* B62J *1/08*
U.S. Cl. 280—278 **25 Claims**



1. In a bicycle having a front steerable wheel and a footpeddle chain-driven rear wheel;

a bicycle frame comprised of a structural beam having a top and bottom girder rigidly connected by a structural-positioning member extended between the said top and bottom girders;

a plurality of orifices positioned longitudinally along the structural beam;

a swivelable steering connection selectively attachable to one of the plurality of orifices in the structural beam between a forked front-wheel-attachment member at a bottom of the swivelable steering connection and a handlebar attachment means at a to of the swivelable steering connection;

a rear-wheel fork member extended from a rear end of the structural beam to a rear-axle connection means at one side of the frame and a rear-wheel fork member extended from the rear end of the frame to a rear-axle connection means at a opposite side of the frame;

a bicycle seat post selectively attachable to one of the plurality of orifices in the structural beam and extendable vertically from said structural beam of the bicycle frame;

a bicycle crank attachable rotatably to the rear end of the frame in line with said frame and the center of said rear wheel and having chain-wheel means in selective chain-drive relationship to a bicycle rear-wheel axle at the rear-axle connection means.

5,072,962

FRONT/REAR MOUNTED PORTABLE LOAD-BEARING WINCH

Robert W. Webb, Tulsa, Okla., assignor to Ramsey Winch Company, Tulsa, Okla.

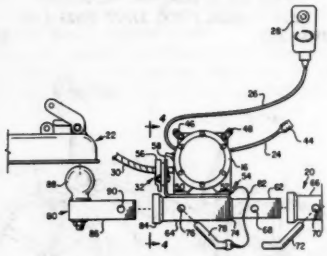
Filed Feb. 12, 1990, Ser. No. 478,446
Int. Cl.[5] B60D *1/00;* B60P *3/10*
U.S. Cl. 280—414.1 **20 Claims**

1. Winch apparatus adapted for use in a pulling train between a vehicle having a hitch and a load, comprising:

a winch;

a drawbar rigidly connectable to the vehicle hitch so as to extend therefrom to define a downward load-bearing end without other support to the vehicle, saw drawbar including a first end constructed for releasable attachment to the vehicle hitch and the load-bearing end constructed for releasable attachment to the load; and

means for fastening said winch to said drawbar so that said winch is anchored with respect to said vehicle and the



load, but is removable with said drawbar from said vehicle hitch and said load.

5,072,963

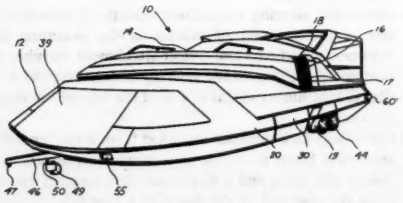
RECREATION BOAT/TRAILER VEHICLE

Luiz J. M. Avillez de Basto, R. Anunze 303, Sao Paulo, Brazil

Filed Jun. 15, 1990, Ser. No. 538,756

Int. Cl.[5] B60P *3/10*

U.S. Cl. 280—414.1 **25 Claims**



1. For use in camping and boating, a combination trailer home and boat assembly adapted to be towed by a towing vehicle, the assembly comprising:

a trailer including a frame structure supported on at least one transverse axle having wheels attached at opposite ends, said trailer further including attachment means for attaching said trailer to a trailer hitch on the towing vehicle,

a support cradle mounted to an upper side of said frame structure and structured and disposed to facilitate sliding receipt and removal of a boat thereon,

said boat adapted to be removably carried in a stowed position on said support cradle and including entrance means to facilitate entering and exiting an interior living space within said boat,

a super structure formed of fiberglass or other suitable material and mounted to said trailer in at least partially surrounding relation to said support cradle, said super structure being dimensioned and configured to conform with an outer configuration of said boat to present the appearance of a unitary, aero-dynamically designed vehicle when said boat is in the stowed position,

said super structure including a vertically extending side wall structure disposed in at least partially surrounding relation to said support cradle and including two oppositely disposed side walls extending longitudinally along opposite sides of said frame structure and a nose portion disposed on a front end of said frame structure and connecting between said opposite side walls, said side wall structure dimensioned and configured to extend substantially vertically upward from said frame structure in at least partially covering relation to sides of a hull portion of said boat, substantially conforming with the outer configuration thereof,

said super structure further including at least one retractable staircase assembly disposed in aligned relation with said entrance means on said boat to further facilitate entering and exiting said interior living space within said boat,

storage means including a nose compartment disposed within an interior chamber of said nose portion of said super structure, and including an access door hingedly attached to said super structure and defining an outer surface of said nose portion, and

whereby said assembly is useful as a trailer home on land with the interior living space being readily accessible and useful with said boat in the stowed position and whereby said boat is independently useful as a water craft when removed from said trailer.

5,072,964

TRAILER COUPLER SAFETY CABLE DEVICE

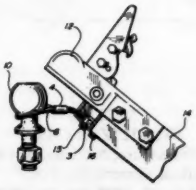
Earl A. Schule, HCR 3, Box 266, Deer River, Minn. 56636

Continuation of Ser. No. 388,816, Dec. 13, 1989, abandoned.

This application Jan. 29, 1991, Ser. No. 647,151

Int. Cl.[5] B60D *1/28*

U.S. Cl. 280—457 **1 Claim**



1. A trailer hitch safety cable apparatus for safety attachment of a trailer tongue to a trailer hitch ball at an attachment point along the longitudinal axis of the trailer tongue and immediately behind a trailer coupler, comprising a ferrule plate sized to fit along an inside surface of said tongue, means for attachment of said ferrule plate against said tongue along the longitudinal axis of said tongue; said means comprising at least one hole in said ferrule plate for containing a fastener for connection to said tongue, said ferrule plate having two holes perpendicularly aligned with respect to said at least one hole; a cable loop having two ends affixed to said ferrule plate, in said two holes and having a loop size sufficient to extend forwardly beneath said trailer coupler; and a sleeve encircling said cable loop, said sleeve having an opening sufficiently large to permit slidable engagement about said cable loop to permit said sleeve to be moved along said loop to form a loop closure about said trailer hitch ball shank.

5,072,965

SUSPENSION CONTROL DEVICE

Shunichi Wada, and Shigeki Ohtagaki, both of Hyogo, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

Filed May 30, 1990, Ser. No. 530,526

Claims priority, application Japan, May 31, 1989, 1-137959; May 31, 1989, 1-137960

Int. Cl.[5] B60G *17/00*

U.S. Cl. 280—707 **2 Claims**

1. A suspension control device comprising:

acceleration detecting means for detecting acceleration in vertically opposite directions of a vehicle body,

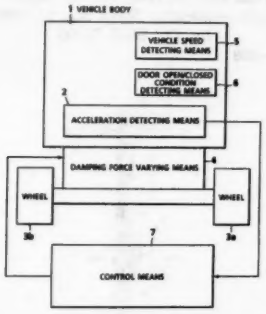
a vehicle speed detecting means for detecting the vehicle's cruising speed,

a door open/closed condition detecting means for detecting a door open/closed condition,

a plurality of suspension means individually provided between corresponding wheels of a vehicle and said vehicle body for supporting said vehicle body on said corresponding wheels,

damping force varying means for varying a damping force of said suspension means, and

control means for controlling said damping force varying means so as to vary the damping force of said suspension means to an optimum value when a sprung resonance is detected and the accumulated duration time thereof is judged to be equal to or greater than a predetermined time by determining a magnitude of the vertical acceleration equal to or greater than a predetermined level with respect to a reference value of an output signal from said



acceleration detecting means and measuring a cycle of vibration of said vehicle body from a timing when the magnitude of the vertical acceleration is determined to be equal to or greater than the predetermined level, wherein said control means maintains the damping force thereof until said vehicle speed detecting means detects a zero speed to determine a stoppage of the vehicle and said door open/closed condition detecting means detects a door open condition.

5,072,966

ENERGY ABSORBING STRUCTURE FOR VEHICLE BODY SIDE PORTION

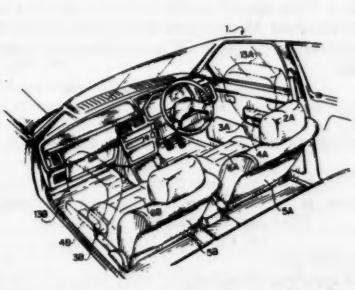
Hideki Nishitake; Toshihiro Ishikawa, both of Hiroshima; Haruhisa Kore, Kure; Kenichi Okuda, and Kazuhiro Murashige, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 8, 1991, Ser. No. 666,870

Claims priority, application Japan, Mar. 13, 1990, 2-63554; Mar. 24, 1990, 2-74791; Mar. 24, 1990, 2-74792; Feb. 12, 1991, 3-18679

Int. Cl.[5] B60R *21/16*

U.S. Cl. 280—730 **31 Claims**



1. An energy absorbing structure for a vehicle body side portion, comprising:

a pair of vehicle body members constituting two side portions of a vehicle body;

a pair of collision detection means for respectively detecting collisions on two side surfaces of the vehicle body;

one air bag which is mounted in each of said vehicle body members, can be unfolded toward an interior of a passenger room, and can receive at least one passenger who is moved sideways by a side collision in an unfolded state;

timing varying means for changing unfolding timings of the two air bags in accordance with a side-collision direction on the basis of detection results from said collision detection means; and

air bag unfolding means for unfolding the air bags in accordance with the unfolding timings set by said timing varying means.

5,072,967

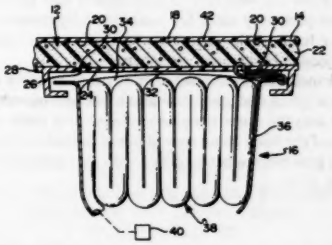
INSTRUMENT PANEL WITH INVISIBLE AIRBAG DEPLOYMENT DOOR

Bruce Batchelder, Barrington, and Scott Rafferty, Dover, both of N.H., assignors to Davidson Textron Inc., Dover, N.H.

Filed Jul. 12, 1990, Ser. No. 551,318

Int. Cl.[5] B60R *21/045, 21/22*

U.S. Cl. 280—732 **8 Claims**



1. A cover assembly including an outer cover member for concealing an airbag restraint system (16) including an airbag, a housing for the airbag, a gas generator located in the housing for supplying gas to the airbag in response to vehicle impact the cover assembly comprising:

the outer cover member (14) having an inner surface with grooves (2) formed therein forming edges of a segment (44) to be separated from said outer cover member for forming an opening (46) for deployment of an airbag into a passenger compartment of a vehicle;

backing means (22) including foam filling said grooves and a rigid plate (24) backing the foam and located inboard of said outer cover member for preventing collapse of said cover member at said grooves;

said rigid plate (24) being engageable with said airbag as it inflates to cause said rigid plate to stress the outer cover member at said grooves to cause said segment to separate from said outer cover member so as to produce a passage through said outer cover member for deployment of the airbag therethrough and into a passenger compartment of a vehicle.

5,072,968

SEAT BELT SYSTEM WITH TENSIONLESS FUNCTION AND ACCELERATION SENSOR

Tetsuya Hamaue, Shiga, Japan, assignor to Takata Corporation, Tokyo, Japan

Filed Oct. 30, 1990, Ser. No. 605,321

Claims priority, application Japan, Nov. 13, 1989, 1-294279

Int. Cl.[5] B60R *22/36, 22/46*

U.S. Cl. 280—806 **8 Claims**

1. A seat belt system comprising:

a retractor for performing a tensionless function to prevent retraction of a seal belt;

acceleration sensor means for sensing only a negative acceleration in the direction in which a vehicle is advanced; and

cancelling means for cancelling the tensionless function of said retractor in accordance with a signal received from said acceleration sensor means;

said retractor comprising:

a reel shaft for taking up the seat belt, said retractor having an axially extending portion;

a retractor body for rotatably supporting said reel shaft;

a gear plate fixed to said reel shaft and having inner teeth;

a disk-shaped gear holder having a central opening rotatably fit around said reel shaft, said gear holder including outer teeth on its outer periphery;

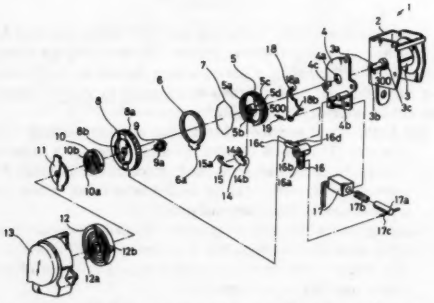
a cover mounted to said retractor body to cover said gear plate and said gear holder;

a helical return spring contained within said cover, said return spring having an inner end fixed to said reel shaft and an outer end fixed to said cover, whereby said reel shaft is always urged in a direction to take up the seat belt;

a memory spring having an inner end fixed to said reel shaft and an outer end fixed to said gear holder, whereby said gear holder may be rotated in a direction to take up the seat belt;

an idler gear rotatably supported by a support shaft extending from one side of said gear holder and having on its outer periphery teeth for meshing engagement with said inner teeth of the gear plate, said idler gear including a projection on its outer periphery;

a hook including a base end pivotally supported by a peripheral edge of said gear plate and a free end movable out of and into the outer periphery of said gear plate, said free end of the hook being moved out of the outer periphery of said gear plate when engaged with said projection of said idler gear;



a hook spring for urging said free end of said hook in a direction to move said free end of the hook into the outer periphery of said gear plate;

said gear holder further including a projection engageable with said free end of the hook when the free end of said hook is moved out of the outer periphery of said gear plate, said gear holder being free to rotate in a direction to take up the seat belt when said projection of the gear holder is in engagement with said free end of the hook, said projection and said hook being brought into contact with one another when said gear holder is rotated in an opposite direction;

a lever including a pawl engageable with said outer teeth of the gear holder, said lever being movable in such directions that said pawl may be engaged with and disengaged from said outer teeth;

means for moving said lever in a forward direction such that said pawl may be engaged with said outer teeth; and

means for moving said lever in a rearward direction such that said pawl may be disengaged from said outer teeth;

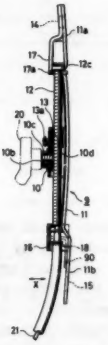
said lever being active to prevent said gear holder from rotating in a direction to take up the seat belt when said pawl of the lever comes into engagement with said outer teeth, and said gear plate and said reel shaft being prevented from rotating in a direction to take up the seat belt when said hook comes into engagement with said projection of the gear holder, whereby said retractor is held in a tensionless state.

5,072,969

SHOULDER BELT ADJUSTING APPARATUS OF A SEAT BELT

Misao Kamiyama, Shiga, Japan, assignor to Takata Corporation, Tokyo, Japan

Filed Aug. 10, 1990, Ser. No. 565,577
Claims priority, application Japan, Sep. 12, 1989, 1-235957
Int. Cl.[5] B60R *22/00*
U.S. Cl. 280—808 **7 Claims**



1. A shoulder belt adjusting apparatus for a seat belt adapted to support a belt anchor for loosely holding a shoulder belt, comprising:

a guide rail adapted to be attached to a vehicle and having upper and lower portions;

an anchor supporting member slidably attached to the guide rail to support the belt anchor;

a screw shaft disposed parallel to the guide rail and having upper and lower ends rotatably attached to the upper and lower portions of the guide rail, said upper end of the screw shaft being supported by and suspended from the upper portion of the guide rail; and

a moving member screwed to the screw shaft, said moving member being moved along the guide rail when the screw shaft is rotated, said moving member having means for loosely supporting the anchor supporting member in a lateral direction perpendicular to the guide rail so that lateral force applied to the anchor supporting member perpendicular to the guide rail is substantially directly supported by the guide rail without affecting to the screw shaft.

5,072,970

PERFORMANCE ENHANCEMENT ASSEMBLY FOR SKIERS OR THE LIKE

Walter Dandy, III, and Tony Nespor, both of Baltimore, Md., assignors to Ski Technology Holdings, Inc., Baltimore, Md.

Filed Jan. 22, 1991, Ser. No. 644,240
Int. Cl.[5] A63C *5/00, 9/00*
U.S. Cl. 280—811 **4 Claims**

1. An apparatus for shifting the body weight of a skier from the skier's legs to a skier's ski or skis through the skier's boot or boots as the skier crouches over the ski or skies comprising:

a spring assembly including a loop of elastic rod-shaped material stretchable during crouching movement of a skier's legs between a standing position and a fully crouched position of the skier, a housing defining an elongated channel for enclosing a first portion of said loop for stretchable longitudinal movement in parallel rod-shaped

branches terminating in a base bend, and means for securing the base bend of the loop within the housing;

a socket defined by said housing of the spring assembly;

rigid pole means having a bottom end detachably supported in said socket and a top end with a bearing therein;

a cord having a bottom end connected to a top bend of the loop of rod-shaped elastic material at a second portion external of said housing, said cord extending vertically over said bearing and terminating in a top end;

strap means disposable about the thigh or thighs of a skier's legs connected to the top end of said cord; and

means for supporting the housing of the spring assembly on the boot or boots of the skier;

whereby said spring assembly supports a portion of the skier's body weight as the skier crouches during skiing, thereby shifting that portion of body weight from the skier's legs to the ski or skis through the skier's boot or boots.

5,072,971

MALE-FEMALE FITTING ELEMENT, IN PARTICULAR FOR HOSES HAVING A LARGE DIAMETER

Gianfranco Roman, Pasiano, Italy, assignor to Claber S.p.A., Italy

Filed Feb. 14, 1990, Ser. No. 480,116

Claims priority, application Italy, Feb. 20, 1989, 19494 A/89

Int. Cl.[5] F16L *55/00*

U.S. Cl. 285—88 **2 Claims**

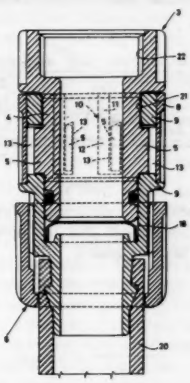
1. A male-female fitting element, comprising:

a male element having a hollow cylindrical tang, said tang providing a plurality of radially protruding ribs oriented in an axially direction; and

a female element including a hollow cylindrical casing having an internal wall provided with a plurality of axial grooves for sliding reception of said ribs, each of said grooves being flanked by a lateral seat suitable for receiving each of said ribs by rotation of said male element after said ribs are slid to ends of said grooves, said lateral seats providing shoulders for abutting extremities of said ribs,

wherein said female element further includes a Belleville washer located at an extremity of said female element opposite to an entry extremity for said male element, said Belleville washer urging said male element ribs engagement with said lateral seat shoulders for preventing removal of said male element from said female element when said ribs are disposed in said lateral seats,

wherein said annular rib extremities and said lateral seat shoulders are each formed by two inclined planes relative



to a circumference of said female element for retarding rotational removal of said ribs from said lateral seats.

5,072,972

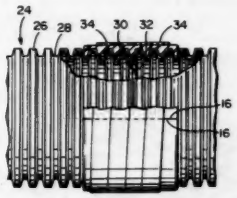
COUPLING DEVICE

Donald R. Justice, P.O. Box 458, Matlacha, Fla. 33909

Filed Oct. 26, 1990, Ser. No. 603,601

Int. Cl.[5] F16L *21/02*

U.S. Cl. 285—373 **13 Claims**



1. A coupling device for joining abutting ends of corrugated polyethylene liquid drainage pipes and for adapting an end of a corrugated polyethylene drainage pipe to be held within the coupling device so that the coupling device may be adhesively bonded within a smooth wall bore of a receiving pipe or fitting, said coupling device comprising:

two coupling sections for surrounding one end of at least one section of corrugated polyethylene drainage pipe,

means for holding the two coupling sections together,

each coupling section including a corrugated interior wall for engaging in the corrugations of an exterior wall of the corrugated polyethylene drainage pipe and said coupling sections and said means together having a continuously smooth circular exterior wall, and

said coupling sections being made of a different material from the corrugated polyethylene drainage pipe.

5,072,973

DOOR HOLD OPEN DEVICE

Robert C. Gudgel, and William Baker, both of Indianapolis, Ind., assignors to Motus Incorporated, Indianapolis, Ind.

Filed Oct. 4, 1989, Ser. No. 416,929

Int. Cl.[5] E05B *65/10*

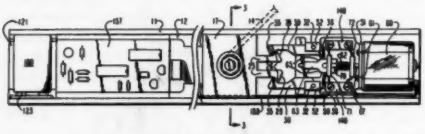
U.S. Cl. 292—55 **14 Claims**

1. A releasable door hold open device, comprising:

a latching means for latching a door in an open position without continuous application of energy,

electrical power supply receiving means, and

power sensing means operatively connected to said power supply receiving means and said latching means to prevent the latching means from latching a door in an open position when the power from the power supply receiving means falls below a predetermined threshold, said threshold being high enough that the power is sufficient to unlatch said latching means.



5,072,974

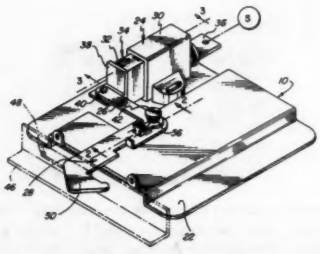
PUSH TO CLOSE LATCH FOR SELF-CLEANING OVEN

John R. Henne, Burlington, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Feb. 7, 1991, Ser. No. 652,123

Int. Cl.[5] E05B *47/00*

U.S. Cl. 292—126 **11 Claims**



1. In an oven door latching system for use with a stove having an oven door, a latch assembly including;

(a) a base member adapted to be mounted on the stove adjacent the oven opening;

(b) a latch bolt having its one end pivotally mounted on a pivot pin on said base member and having a latch arm at the other end engageable with the associated oven door;

(c) a positioning device mounted on said base member having a reciprocatable element movable between first and second stable positions;

(d) a lever having one end pivotally coupled to said reciprocatable element of said positioning device, said lever being pivotally mounted on said pivot pin at a point spaced from its said one end;

(e) means connecting said latch bolt and said lever adjacent said pivot pin whereby, when said positioning device is actuated to move said reciprocatable element between said first and second stable positions, pivotal motion is imparted to said lever and said connecting means enables pivotal motion of said latch bolt; and

(f) actuatable means for acting on said positioning device to move said lever to enable movement of said bolt between an oven door latching position and an oven door unlatching position.

5,072,975

SWITCH BOX OF LOCK DEVICE FOR VEHICLE

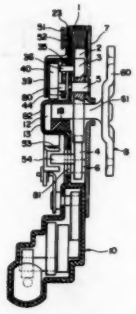
Yoshikazu Hamada; Yozo Ogino, and Katsuya Ashizawa, all of Utsunomiya, Japan, assignors to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 27, 1990, Ser. No. 515,944

Claims priority, application Japan, Apr. 27, 1989, 1-108457; Jun. 28, 1989, 1-166429

Int. Cl.[5] F05C *3/26*

U.S. Cl. 292—201 **4 Claims**



1. A lock device for a vehicle having a synthetic resin body having a surface side and a back side, comprising:

a recess formed on the surface side of the said resin body;

a latch stored in said recess and meshing with a striker fixed to a car body;

a swell portion formed on the backside of said resin body, having a C-shaped sectional shape, having an upper wall and having on its inner wall a guide groove for said striker;

an enclosure wall formed integrally with said resin body at a position above the upper wall of said swell portion on the back side of said resin body;

a box defined between a lower surface of said enclosure wall and the upper wall of said swell portion;

a switch stored in said box for detecting the rotating position of said latch; and

wherein said switch includes a plurality of contact surfaces connected to contact legs, a rotary contact for short-circuiting said contact surfaces with one another and a spring for pushing said rotary contact to said contact surfaces.

5,072,976

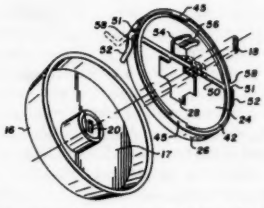
LOCKING ACCESSORY

Steve P. Meszaros, 413 Bromley Street, Coquitlam, B.C., Canada V3K 6N7

Filed Dec. 28, 1990, Ser. No. 635,901

Int. Cl.[5] E05C *3/04*; E05B *13/02*

U.S. Cl. 292—207 **3 Claims**



1. A lock accessory for a deadbolt lock, said deadbolt lock having an actuating knob, a lock plate with a circular periphery and a tailpiece engaging the actuating knob, said lock accessory comprising:

an intermediate plate for location between the lock plate and a door on which the lock is provided, said intermediate plate having an annular peripheral wall conforming in size to the periphery of the lock plate;

means defining in said intermediate plate an opening through which the tailpiece extends;

manually actuatable locking means mounted on said intermediate plate for selectively preventing and permitting rotation of said tailpiece;

said locking means comprising a locking member movably mounted in said peripheral wall and being displaceable into a first position in which said locking member is in locking engagement with the tailpiece, and a second position in which said locking member is displaced out of locking engagement with the tailpiece, and manually engageable means for effecting the displacement of said locking member between the first and second positions;

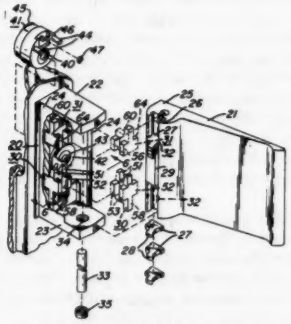
said locking member comprising a slide member extending through recesses in said peripheral wall at opposite sides of said intermediate plate, and further comprising an annular spring member extending around the interior of said peripheral wall and bearing resiliently against said slide member for slidably retaining said slide member relative to said intermediate plate, said peripheral wall having inwardly extending means for retaining said annular spring member.

5,072,977

PADDLE LATCH DEVICE

Norman A. Millman, Dresher, and Fouad F. Korban, Flourtown, both of Pa., assignors to Trans-Atlantic Company, Philadelphia, Pa.

Filed Jul. 29, 1991, Ser. No. 737,187
Int. Cl.[5] **E05C** *15/02*
U.S. Cl. 292—336.3 **16 Claims**



1. A door latch retraction device for doors which may be hinged at either the left side or the right side and which utilizes a paddle type actuator in a selected one of a push or pull mode, comprising in combination,

a) a generally rectangular case (**20**) having a base wall (**36**), top (**22**) and bottom (**23**) spaced apart end walls and a pair of spaced apart side walls (**24**),

b) a rotary gear (**37**) within said case having one of the gear faces disposed flatwise adjacent to said case base wall (**36**),

c) a rotary shaft (**39**) secured to said rotary gear (**37**), with the cylindrical axes of said gear and shaft in alignment, and with said shaft extending through said case base wall (**36**) on the opposite side thereof from said rotary gear (**37**),

d) a gear driver (**30**) for said rotary gear (**37**), said gear driver having a plurality of gear driving teeth (**51**) disposed in a common plane with and drivingly engageable with the teeth of said rotary gear (**37**), said gear driver also having first (**52**) and second (**53**) pairs of spaced apart lugs with one lug of each of said pairs of lugs lying in a first common plane orthogonal to the said plane of the said gear driving teeth (**51**), and with the other lug of each of said pairs of lugs lying in a second common plane orthogonal to the said plane of the said gear driving teeth (**51**), said first and second common planes being parallel spaced apart, and said planes of said first pair (**52**) and said second pair (**53**) of spaced apart lugs being parallel to and disposed on opposite sides of the said common plane of said gear driving teeth (**51**) and the teeth of said rotary gear (**37**),

e) guide means (**54** or **55**) within which one of said pairs of first (**52**) and second (**53**) pairs of spaced apart lugs of said gear driver (**30**) is disposed for linear movement between said pair of case side walls (**24, 24**),

f) biasing means (**61**) engaged with said gear driver (**30**) operative to resiliently bias said gear driver proximate to the inside face of one of said side walls (**24**) for movement along said guide means (**54** or **55**) away from said one case side wall (**24**) toward the opposite case side wall (**24**) to thereby rotate said rotary gear (**37**) and shaft (**39**) in a given direction when said gear driver (**30**) is moved linearly against said biasing means (**61**), and

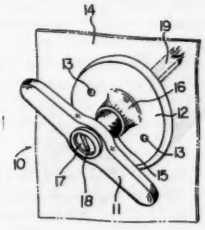
g) an actuator paddle (**21**) having driver ears (**28/28A**) extending laterally therefrom with said ears projecting into the space between the pair of spaced apart gear driver lugs (**52** or **53**) which are not disposed within said guide means (**54** or **55**), said paddle (**21**) being positioned between said case end walls (**22, 23**) for swinging movement about an axis transverse to the line of movement of said gear driver (**30**).

5,072,978

INSIDE LOCK FOR LATCHES OF CAMPER SHELLS, AND SIMILAR STRUCTURES

Jonathan Woodward, 625 N. Stone Ave., Tucson, Ariz. 85705

Filed Aug. 30, 1990, Ser. No. 575,359
Int. Cl.[5] **E05B** *13/00*
U.S. Cl. 292—359 **19 Claims**



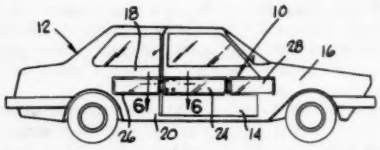
1. An inside lock for a latch of a camper shell and similar structures, comprising, a latch for attachment to the outside of a door, said latch comprising a housing for fixed attachment to the outside of the door, and including a housing, a handle rotatably mounted in said housing and including locking means rotatable at said handle for locking rotation of said handle outside said structure; a rotatable member extending from said housing and rotatable with said handle through said door; actuating means mounted on said rotatable member for rotation therewith and latch means operatively connected to said actuating means; a lock member comprising a further housing for fixed attachment to the inside of the door and including a bore surrounding said rotatable member, said rotatable member freely rotatably in said bore; at least one transverse hole through said further housing, penetrating into said bore; a removable member for insertion into said hole, and including a part for abutment against a flat surface on said rotatable member, to prevent rotation thereof.

5,072,979

PROTECTIVE PANEL FOR AUTOMOTIVE VEHICLE

Randolph M. Swinton, 2174 S. Racine Way, Y201, Aurora, Colo. 80014

Filed Oct. 15, 1990, Ser. No. 532,801
Int. Cl.[5] B60R 19/42
U.S. Cl. 293—128 16 Claims



1. A protective panel for automobiles comprising:
a first generally flat generally rectangularly shaped panel section formed of a hard plastic material;
a second generally flat generally rectangularly shaped panel section formed of a hard plastic material and hingedly attached to said first panel section;
anti-theft tabs attached to an inner surface of said first panel section and formed to be hooked around a door edge of the automobile and wedged in a door jamb to prevent removal of the protective panel from the automobile;
attachment means in the form of magnets attached to inner surfaces of said first and second panel sections respectively for removably attaching the protective panel to a side of the automobile; and
padding strips attached to the inner surface of said first and second panel sections to prevent scratching of the automobiles by the protective panel.

5,072,980

HELICAL BARBED TAPE RECOVERY TOOL

John W. Mainiero, Sandy Hook, Conn., assignor to MRM Security Systems, Inc., Waterbury, Conn.

Filed Aug. 20, 1990, Ser. No. 570,028
Int. Cl.[5] B65G 7/12
U.S. Cl. 294—15 7 Claims

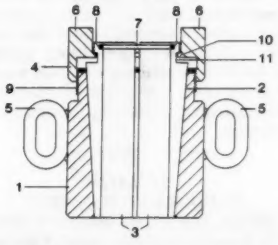
1. A hand tool for rapidly recovering an extensible and retractable antipersonnel barrier of helical barbed tape, said hand tool being generally U-shaped and comprising first and second outwardly extending generally parallel elongated gripping arms and a base section, said gripping arms including first and second generally L-shaped rigid safety barriers respectively, said first and second rigid safety barriers having elongated lateral guard rails and forward guard rails respectively, the distal ends of said forward guard rails disposed on the distal ends of said gripping arms respectively, the distal ends of said elongated lateral guard rails disposed intermediate said base section, said first and second rigid safety barriers and said first and second elongated gripping arms forming generally rectangular zones of safety respectively therebetween, said hand tool further including an elongated engaging arm disposed on the periphery of, and intermediate said base section, said elongated engaging arm extending outwardly from said base section between said elongated gripping arms, said elongated engaging arm being parallel to said first and second gripping arms, whereby the gripping arms are grasped by the users within said zones of safety, and the engaging arm is inserted into the coil of helical barbed tape and thereafter force is applied to the gripping arms so as to collapse the barrier into a nested condition.

5,072,981

SOIL MOISTURE TUBE EXTRACTION DEVICE

Barry A. Weaver, and Douglas E. Whitt, both of Laporte, Colo., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C. and Colorado State University Research Foundation, Fort Collins, Colo.

Filed Oct. 26, 1990, Ser. No. 603,505
Int. Cl.[5] B66C 1/44
U.S. Cl. 294—102.1 2 Claims



1. An annular device for securely gripping the outer surface of a cylindrical object and pulling said object against a resistant force comprising:
a. an annular sleeve adapted to loosely fit around the cylindrical object, wherein said sleeve has a tapered inner surface and an external means adapted for applying a force substantially parallel to the axis of the cylindrical object;
b. at least two conically tapered jaws, each having along its longitudinal axis a first end adapted to fit between the inner surface of the sleeve and the outer surface of the cylindrical object and a second end adapted to protrude from said sleeve, wherein said second end has both an exterior transverse groove and an interior transverse groove, said exterior groove being intermediate to the interior groove and the first end along said longitudinal axis;
c. an annular collar adapted to fit around the cylindrical object and to fasten to the sleeve by means of mating threads in the collar and the sleeve, and further adapted to engage said exterior groove in each of the jaws; and
d. a snap ring adapted to engage said interior groove in each of the jaws and thereby retain the jaws on said collar, wherein said collar and said snap ring collectively serve to secure the jaws within the sleeve so that the jaws frictionally engage both the inner surface of the sleeve and the outer surface of the cylindrical object.

5,072,982

TUBULAR TWEEZER

Harold O. Boss, Corona del Mar, Calif., assignor to Loral Aerospace Corp., New York, N.Y.

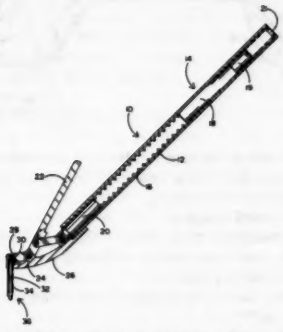
Filed Feb. 27, 1990, Ser. No. 485,697
Int. Cl.[5] B66C 1/42; B23P 19/04
U.S. Cl. 294—103.1 8 Claims

1. A tool for handling fiber optic connectors, comprising:
a) a handle;
b) a thin, elongated collet tube extending from said handle, said tube having an internal surface defining a passage, a distal end portion of said internal surface being inwardly tapered;
c) a pintle axially movable within said passage of said tube,

said pintle having a diameter smaller than the diameter of said passageway and being transversely movable therein, said tube having an object grasping wall portion and an opposite wall portion on opposite sides of said passage;

d) spring means for biasing said pintle transversely toward said opposite wall portion toward a releasing position;

e) a recessed substantially axially oriented grasping surface formed on said pintle at a distal end portion of said pintle,



said surface being adapted to bias an object to be grasped against said object grasping wall portion of said tube;

f) said inwardly tapered portion of said internal surface being arranged to engage said distal end portion of said pintle so as to move said grasping surface transversely toward said object grasping wall portion when said pintle is moved axially toward said distal end portion of said tube; and

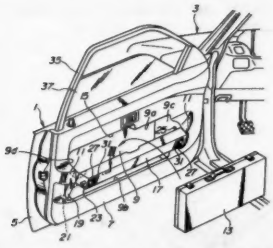
g) actuating means on said handle for moving said pintle axially within said tube.

5,072,983

AUTOMOTIVE DOOR WITH DOOR POCKET AND TILTABLE ARMREST

Kishiro Muroi, and Soushichi Koura, both of Yokohama, Japan, assignors to Ohi Seisakusho Co., Ltd., Yokohama, Japan

Filed Oct. 23, 1990, Ser. No. 600,766
Claims priority, application Japan, Oct. 26, 1989, 1-124509[U]
Int. Cl.[5] B60R *7/04*
U.S. Cl. 296—37.13 **7 Claims**



2. An automotive door having an inboard side, said door comprising:

first means for providing said inboard side of said door with a recess which serves as a door pocket said recess having a mouth part which faces generally perpendicularly with respect to said inboard side of said door;

an elongate armrest member;

a hinge arm extending upward from a lower portion of said recess, said hinge arm having an upper portion secured to said armrest member and a lower portion pivotally connected to said door, so that said armrest member can pivot about the pivoted portion of said hinge arm between an operative position wherein said armrest member extends horizontally across said mouth part of said recess leaving portions of said mouth part above and below said armrest member exposed and an inclined open position wherein said armrest member is rotated away from said inboard side of said door and is out of contact with said mouth part of said recess thereby to enlarge the size of the said mouth part of said recess; and

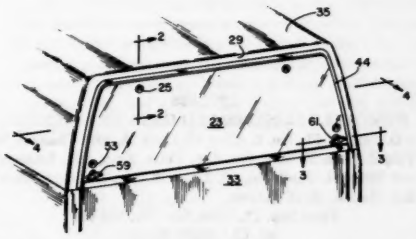
third means for latching said armrest member to the door when said armrest member assumes said operative position.

5,072,984

VEHICLE CAP WINDOW AND HINGE THEREFOR

Willard O. Jackson, 58434 Glenford Dr., Goshen, Ind. 46526

Filed Feb. 11, 1991, Ser. No. 653,175
Int. Cl.[5] B62D *25/00*
U.S. Cl. 296—56 **4 Claims**



1. A frameless truck cap lift door having a concealed hinge structure comprising:

a transparent window portion of generally uniform thickness having at least a pair of holes along an upper edge thereof;

a relatively rigid support bar having at least a pair of holes simultaneously alignable with the window holes;

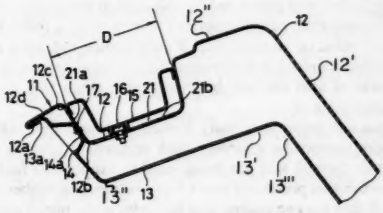
a pair of hinges adapted to be fastened near an upper edge of the truck cap, each hinge having a pivotable arm extending from a truck cap and terminating in an apertured flange, the spacing between the flanges when the hinges are fastened to a truck cap being substantially the same as the spacing between the holes in the support bar and the holes in the window whereby a pair of threaded fasteners may be passed each through the window, the support bar and a corresponding apertured for securing the window pivotably to the cap.

5,072,985

TRUNK LID STRUCTURE FOR VEHICLE

Kazuhiro Yanagimoto, Hamana, and Akira Hijikata, Hamamatsu, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 449,530, Dec. 11, 1989, abandoned.
This application Dec. 21, 1990, Ser. No. 632,591
Claims priority, application Japan, Feb. 13, 1989, 1-33329[U]
Int. Cl.[5] B62D *25/12*
U.S. Cl. 296—76 **6 Claims**



1. A vehicle trunk lid structure comprising: an outer panel

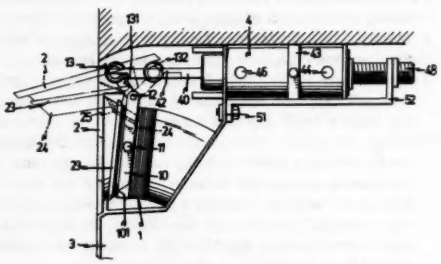
bent in a substantially L shape with a first wall normally in a horizontal position and a second wall normally in a vertical position, said first wall and said second wall defining a recess zone substantially at a center of said second wall, said recess zone being formed by bent portions of said outer panel for fixation of a trim element; an inner panel bent in a substantially L shape, positioned spaced from said outer panel and including an inner panel first wall normally in a horizontal position and an inner panel second wall normally in a vertical position and including an end edge of said inner panel second wall, said outer panel including an end overlapping said end edge of said inner panel second wall, said inner panel defining a recessed wall portion with said inner panel recessed wall portion being positioned adjacent said outer panel first wall of said recess zone; and a weld connecting said inner panel first wall to said outer panel first wall.

5,072,986

REMOTELY CONTROLLED GAS CAP ASSEMBLY

Wu D. Tai, 5-1 Fl., No. 1, Alley 18, Lane 38, Min Chuan E. Rd., Taipei; Chen Y. Tzei, No. 836, Chien Kung Rd., Kaohsiung, and Shiau R. Jang, No. 10, Lane 48, Sec. 2, Chung Shan N. Rd., Taipei, all of Taiwan

Filed Sep. 21, 1990, Ser. No. 586,009
Int. Cl.[5] B65D *45/00*
U.S. Cl. 296—97.22 **5 Claims**



1. A remotely controlled gas assembly for an automobile comprising:

a strip mounted around a fuel inlet of a fuel tank of the automobile, said strip extending around said fuel inlet and having two spaced end plates which face each other, a transverse pivot pin being pivotally mounted on said two end plates, a link protruding from a middle portion of said pivot pin at a first end thereof, a second end of said link being attached to a middle portion of a bar having two sides each formed with an annular groove;

a remotely controllable pneumatic cylinder mounted to a frame of the automobile;

a piston rod protruding from a first end of said pneumatic cylinder, said piston rod having a distal forked end which is comprised of two opposite branch rods, a roller being provided on an inner side of each branch rod, each roller being received in a corresponding annular groove in each side of said bar and being movable along said annular groove; and

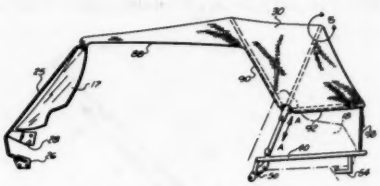
a gas cap being intergrally formed with said link, said gas cap comprising a rubber block protruding from an inner side thereof, said gas being lifted to expose said fuel inlet when said piston rod is in a first position, said rubber block of said gas cap sealing said fuel inlet when piston rod is in a second position.

5,072,987

RETRACTABLE CYCLE ROOF

Marshall T. Allen, 7344 W. Peoria Ave., #1, Peoria, Ariz. 85345

Filed Jun. 18, 1990, Ser. No. 539,204
Int. Cl.[5] B60J *7/08*
U.S. Cl. 296—107 **14 Claims**



1. A roof for protecting a rider of a two-wheeled vehicle having a front end and a back end from rain and excessive sunlight, said roof comprising:

a) a waterproof canopy;

b) frame means coupled to said vehicle for supporting said canopy, said frame means including a stationary portion and a movable portion;

c) coupling means for securing said canopy to said frame means; and

d) pivot means for pivotably securing said movable portion of said frame means to said stationary portion for movement from a substantially vertical position over the rider to a substantially horizontal position surrounding the back end of the vehicle, said pivot means including

i) a pair of hinge posts carried by said stationary portion,

ii) pin means extending through each of said hinge posts and through said movable portion, and

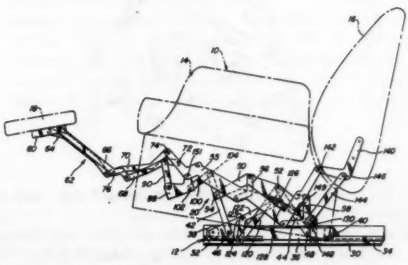
iii) stop means for preventing said movable portion from pivoting too far forwardly relative to said stationary portion, said stop means comprising a flange extending normally to each of said hinge posts and forwardly of said movable portion.

5,072,988

WALL PROXIMITY CHAIR

Jeffrey L. Plunk, Pontotoc, Miss., assignor to Super Sagless Corporation, Tupelo, Miss.

Continuation of Ser. No. 60,032, Jun. 9, 1987. This application Jan. 27, 1989, Ser. No. 303,650
Int. Cl.[5] A47C *1/02*
U.S. Cl. 257—68 **22 Claims**



1. A three-way reclining chair having upright, TV and fully reclined positions including a stationary base; a seat and arm panels constituting a seat assembly fixed to one another and movable with respect to the base; a backrest movable with respect to the seat; and a linkage mechanism enabling the seat assembly and backrest to move as a unit from an upright position to a TV position and for the seat assembly and backrest to move relative to one another from the TV position to a fully reclined position; said linkage mechanism comprising

a base plate on the stationary base and front and rear tracks extending fore and aft mounted on the base plate,

a roller link carrying rollers mounted on the tracks so that the roller link may move fore and aft on the base plate between forwardmost and rearwardmost positions,

front and rear pivot links extending upwardly from and pivotally connected to the roller link for pivotal motion thereon,

a support link pivotally connected to the front and rear pivot links above the roller link and beneath the seat,

a seat support link and a seat drive link pivotally connected to the support link and carrying a seat mounting link, said seat mounting link being fixed to the seat assembly beneath the seat,

a footrest and lazy tong linkage carrying the footrest, said lazy tong linkage being connected to the seat mounting link for moving the footrest with respect to the seat between a first position wherein the footrest is retracted and a second position wherein the footrest is extended,

a drive link connected at one end to the rear pivot link and at its other end to a bell crank pivoted intermediate its ends on the roller link,

a connecting link pivotally connected at spaced points to the bell crank and to the base plate.

and a handle assembly mounted on the seat mounting link and connected to the lazy tong linkage and the front pivot link,

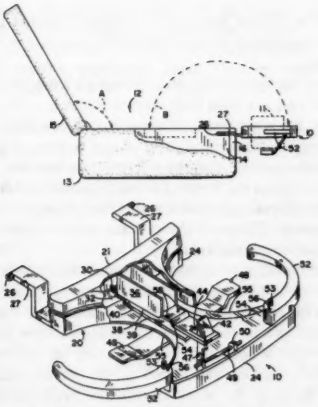
said handle assembly when actuated extending the footrest and moving the front and rear pivot links and the support link in a forwardly direction on the roller link whereby the occupant's weight causes the front and rear pivot links and the support link to move further in a forwardly direction on the roller link and the drive link to turn the bell crank and the connecting link to push against the base plate so that the roller link moves to the forwardmost position on the base plate at the same time as the support link moves forwardly with respect to the roller link, and thereby causing the seat assembly and backrest to move from the upright position to a TV position.

5,072,989

PIVOTED ARM CUPHOLDER

David J. Spykerman, Holland; David P. Marcusen, Zeeland, and Scott W. Doenges, Holland, all of Mich., assignors to Prince Corporation, Holland, Mich.

Filed Sep. 17, 1990, Ser. No. 583,666
Int. Cl.[5] A47C *7/62*
U.S. Cl. 297—194 **22 Claims**



1. A container holder assembly for a vehicle comprising:

a vehicle mounted member with a recess for receiving a container holder for storage;

a container holder and means for mounting said container holder for movement from a storage position in said recess of said vehicle mounted member to a use position in which said container holder extends from said vehicle mounted member, said container holder including a housing and at least one arm movably mounted to said housing and which is extendable and retractable with respect to said housing, said at least one arm being curved to at least partially circumscribe a container when in an extended use position, said container holder further including a support means pivotally mounted to said housing and including a support member spaced below said at least one arm when said support means is in a lowered use position for supporting the bottom of a container, placed thereon; and

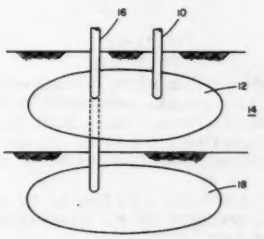
slide means for coupling said support means, slidably attached to said housing, and said at least one arm for positive simultaneous movement such that when said container holder is moved from a stored position to a use position, said support member and said at least one arm are extended to their use positions, and when said housing is retracted into said recess, said at least one arm and said support member are retracted to their stored position.

5,072,990

ACCELERATION OF HYDROCARBON GAS PRODUCTION FROM COAL BEDS

Thomas C. Vogt, Jr., Littleton, and Gerard R. Obluda, Golden, both of Colo., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Jul. 12, 1990, Ser. No. 551,340
Int. Cl.[5] E21B *43/24*
U.S. Cl. 299—4 **15 Claims**



1. The method for producing coal bed methane from a coal seam within a formation comprising:

(a) providing at least one completed gas production well into said seam which fluidly communicates with said seam only;

(b) completing through said coal seam at least one injection well proximate to said production well which injection well does not communicate fluidly with the coal seam but which communicates fluidly with a horizontal fracture at a lower level in the formation;

(c) injecting via said injection well a hot fluid into said horizontal fracture at a pressure less than required to fracture the formation and in a quantity sufficient to heat the coal seam thereby desorbing and volatilizing methane in said seam; and

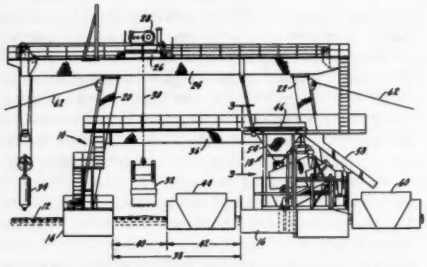
(d) producing desorbed methane from the coal seam via the production well.

5,072,991

FLOATING GRAB DREDGE AND UNLOADING METHOD THEREFOR

Jochen Rohr, 6669 Spindlewick La., Cincinnati, Ohio 45230

Filed Aug. 24, 1990, Ser. No. 571,778
Int. Cl.[5] F02F *3/413, 7/06*
U.S. Cl. 299—9 **8 Claims**



7. A method of operating a floating dredge of the type having first and second pontoons, a support structure mounted on the pontoons, a gantry attached to the support structure, a trolley movably mounted on the gantry, a bucket grab connected to the trolley and movable therewith, and material handling means mounted on one of the pontoons for separating salvageable dredged material from waste, comprising the steps of:

spacing the first and second pontoons sufficiently far apart to define a work space between them, the work space defining a barge slip therein and a digging well adjacent the barge slip;

placing a first barge in the barge slip;

moving the trolley over the digging well and operating the bucket grab to dig up a load of dredged material;

inspecting the dredged material in the grab to determine if it contains salvageable material;

moving the trolley over the first barge if there is no salvageable material in the bucket load and moving the trolley over the material handling means if there is salvageable material; and

dumping the load at the selected location.

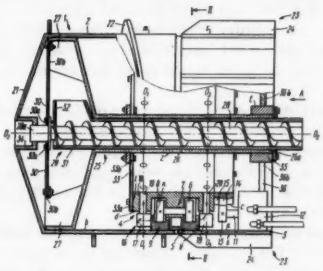
5,072,992

SHIELD UNIT

Valery F. Gorbunov, Pritomskaya Naberezhnaya, 1a, kv. 6; Alexandr F. Eller, prospekt Leningradsky, 3a, kv. 79; Alexandr Y. Tkachenko, Prospekt Lenina, 28, kv. 32; Vladimir V. Axenov, prospekt Oktyabrsky, 44, kv. 208, and Vladimir D. Nagorny, prospekt Oktyabrsky 40, kv. 641, all of Kemerovo, U.S.S.R.

PCT No. PCT/SU88/00231, § 371 Date Jul. 23, 1990, § 102(e) Date Jul. 23, 1990, PCT Pub. No. WO90/05835, PCT Pub. Date May 31, 1990
PCT Filed Nov. 21, 1988, Ser. No. 543,853
Int. Cl.[5] F21D *9/08*
U.S. Cl. 299—33 **7 Claims**

1. A shield unit, comprising: a cylindrical shell having a head section and a tail section arranged in succession one after another, the head section and the tail section being connected by a traversing mechanism, the head section being provided with a cutting tool, an outer portion of the cutting tool having a helical surface and the tail section having means for preventing rotation of the tail section in rock, the traversing mechanism comprising a differential planetary gear train having a stationary sun wheel, the stationary sun wheel being a first ring gear provided on an inner surface of the tail section and engaged with gears of a double-planet gear train having pinions engaged with a second ring gear provided on an inner surface of the head section, the second ring gear being a driven sun wheel, the double-planet gear train being connected with a carrier, the carrier being a first ring positioned coaxially with the cylindrical shell and being connected to a shaft of a prime mover, the shield unit further comprising a mechanism for



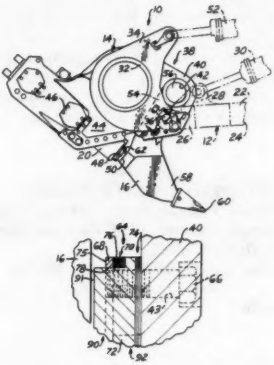
moving the tail section connected to the traversing mechanism and a rock discharge mechanism connected to the traversing mechanism.

5,072,993

SELF-CONTAINED SHIM PACK ASSEMBLY

John M. Dickerson, East Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Dec. 24, 1990, Ser. No. 632,680
Int. Cl.[5] F16C *33/00;* **F16B** *43/00*
U.S. Cl. 299—37 **6 Claims**



1. A self-contained shim pack assembly adapted to be attached to a mounting structure to guide a moveable member, comprising:

a housing having a reference surface, a shim engagement surface and a central hole therebetween;

a plunger having a first portion with a wear surface extending through the central hole of the housing a predetermined distance beyond the reference surface and a second portion within the housing having an enlarged flange;

a first plurality of shim plates within the housing sandwiched between the flange of the plunger and the shim engagement surface of the housing;

a second plurality of shim plates sandwiched between the flange of the plunger and the mounting structure; and means for removably attaching the housing to the mounting structure so that as the extending portion wears and adjustment is needed a shim plate can be removed from the first plurality and added to the second plurality to again position the wear surface the predetermined distance beyond the reference surface.

5,072,994

SHEARING MACHINE WITH MOVABLE SHEARING DRUM AND CONVEYOR

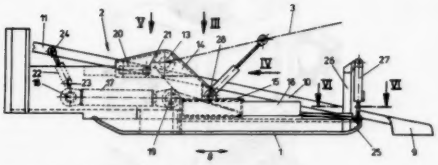
Erich Brandl, Grosslobming; Wolfgang Koch, Weisskirchen, and Alfred Zitz, Zeltweg, all of Austria, assignors to Voest-Alpine Zeltweg Gesellschaft m.b.H., Linz, Austria

Filed May 15, 1990, Ser. No. 523,526

Claims priority, application Austria, May 17, 1989, 1187/89

Int. Cl.[5] E21C *27/24, 35/12*

U.S. Cl. 299—67 **9 Claims**



1. A shearing machine, comprising:

a machine frame;

means for shearing rotatably mounted on a luffable shearing arm;

means for conveying extending in a direction of a heading face to be sheared for receiving a conveying away sheared material, said conveying means being movably supported along a longitudinal direction of said machine frame;

a horizontal luffing axis joint, connected to said shearing arm and extending transversely to said longitudinal direction of said machine frame, said luffing axis joint being movable relative to said machine frame in said longitudinal direction of said machine frame, the movement of said horizontal luffing axis joint of said shearing arm being operatively coupled to the movement of said conveying means by mounting said shearing arm on a bearing bracket which is fixedly attached to a carriage, said carriage being movably mounted on guides extending in said longitudinal direction of said machine frame, said bearing bracket being connected to a driver which is formed by a slot guide, and wherein after said bearing bracket is displaced a predetermined distance in said longitudinal direction of said shearing machine, said bearing bracket interacts with said means for conveying so as to effect movement of the same in said longitudinal direction.

5,072,995

SLIP CONTROL MECHANISM OF A CAR

Makoto Kawamura; Haruki Okazaki; Fumio Kageyama; Kazutoshi Nobumoto, all of Hiroshima, and Toshiaki Tsuyama, Higashi-Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 29, 1990, Ser. No. 604,442

Claims priority, application Japan, Oct. 30, 1989, 1-282273

Int. Cl.[5] B60T *8/58;* **B60K** *31/00, 28/16*

U.S. Cl. 303—100 **7 Claims**

1. A slip control mechanism of a car comprising:

hydraulic booster means for driving master cylinder means for providing hydraulic pressure to first brake means provided for each driven wheel;

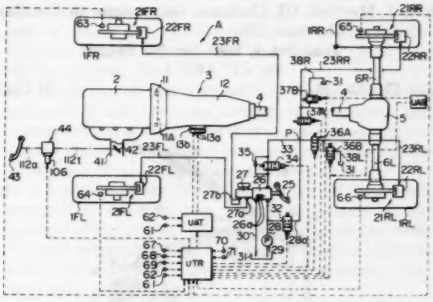
second brake means provided for each driving wheel;

slip detection means for detecting slip of driving wheels;

slip control means for operating the second brake means, based on signals from the slip detecting means, by using the operating oil of the hydraulic booster means as operating oil of the second brake means so as to reduce the slip of the driving wheels, said control means comprising pressure control valve means for controlling hydraulic pressure of the operating oil of the second brake means, including pressure reducing valve means for reducing the hydraulic pressure of the operating oil of the second brake means;

detection means for detecting completion of the slip control by the operation of the second brake means; and,

release means for opening the pressure reducing valve means



for a predetermined time so as to release the operating oil of the second brake means on the occasion of the completion of the slip control by the operation of the second brake means.

5,072,996

BRAKE ACTUATING ASSEMBLY FOR MOTOR VEHICLES

Helmut Heibel, Moschheim, and Leo Gilles, Koblenz, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England

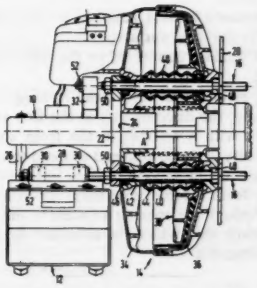
PCT No. PCT/EP89/00971, § 371 Date Mar. 27, 1990, § 102(e) Date Mar. 27, 1990, PCT Pub. No. WO90/02065, PCT Pub. Date Mar. 8, 1990

PCT Filed Aug. 17, 1989, Ser. No. 469,603

Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 8810531

Int. Cl.[5] B60T *13/567, 8/44*

U.S. Cl. 303—114 **6 Claims**



1. Brake actuating assembly for motor vehicles comprising

a master brake cylinder **(10)** to which at least one brake circuit is connectable,

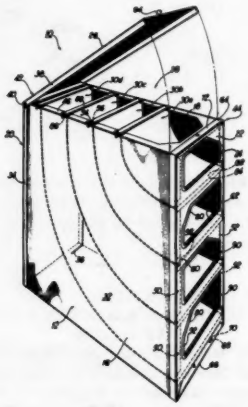
a modulator **(12)** having a fluid connection with said master brake cylinder **(10)** to modulate the pressure in the brake circuit,

A pneumatic braking force booster **(14)** which comprises a housing **(34, 36)** having at least one partition **(38)** movable in piston-like manner and

at least one connecting pin **(16, 18)** which passes through the housing **(34, 36)** of the braking force booster **(14)** for transmitting reaction forces of the master brake cylinder **(10)** to a vehicle wall **(20)**, characterized in that the modulator **(12)** is mounted out of direct contact with said master brake cylinder **(10)** on said at least one connecting pin **(16, 18)** which passes through the housing **(34, 36)** of the brak-

ing force booster (14) and is connected to said vehicle wall.

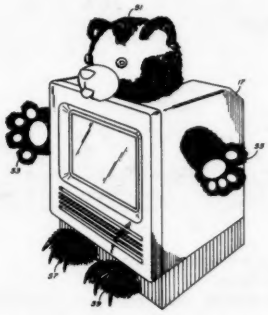
5,072,997
DISPENSER
John T. Mayfield, III, Clarkston, Ga., assignor to The Meyer Company, Cleveland, Ohio
Filed Oct. 9, 1990, Ser. No. 594,092
Int. Cl.[5] A47F *3/02*
U.S. Cl. 312—35 **21 Claims**



1. A dispenser, comprising:
a an enclosure formed of a bottom surface, a back surface, and two side surfaces;
b. a front surface attached to the bottom and side surfaces, which contains at least one opening through which articles stored in the dispenser may be dispensed;
c. a top surface attached to the back, side and front surfaces, which may be positioned to open the top of the dispenser when desired;
d. a first retainer located adjacent to the bottom of each opening in the front surface;
e. a second retainer connected to the top of each side surface; and
f. a flexible member having a mean forming a discontinuity at each end, the discontinuity at the first end adapted to cooperate with a retainer in the front surface and the discontinuity in the second end adapted to cooperate with the corresponding second retainer in the side surfaces, in order to form a removable floor for articles to be dispensed through the opening adjacent to the retainer in the front surface with which the member's first end discontinuity cooperates.

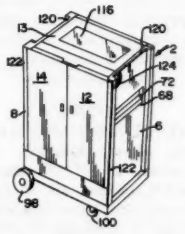
5,072,998
STUFFED ANATOMICAL MEMBERS
Bobby Y. Oh, Hacienda Heights, Calif., assignor to Del Cerro Investment Group, Inc., Diamond Bar, Calif.
Filed Aug. 8, 1989, Ser. No. 391,094
Int. Cl.[5] A47B *97/00*
U.S. Cl. 312—204 **10 Claims**

1. A combination using stuffed anatomically shaped members for the ornamental personification or characterization of a video monitor comprising:
a multi-surfaced video monitor;
a plurality of three-dimensional stuffed anatomically shaped members selectively attachable to said video monitor wherein all of said stuffed anatomically shaped members cooperate with said video monitor to visually define a character;
a first hook and loop fastener mating surface attached to each of said stuffed anatomically shaped members;
a plurality of second hook and loop fastener mating surfaces attachable to one or more surfaces of said video monitor;
each of said second hook and loop fastener mating surfaces being a corresponding mating surface to each of said first hook and loop fastener mating surfaces to thereby facili-



tate detachable attachment of said anatomically shaped members to said video monitor;
each of said stuffed anatomically shaped members serves as an appendage of a character and said video monitor serves as the body of the character; and
each of said anatomically shaped members is formed of a resilient material.

5,072,999
VOTING BOOTH
Frank Trotta, Maplewood, N.J., and Gary Gray, Thompson, Pa., assignors to Electronic Voting Systems, Inc., New York, N.Y.
Filed Oct. 27, 1989, Ser. No. 427,612
Int. Cl.[5] G07C *13/00*
U.S. Cl. 312—249 **16 Claims**



1. A voting booth comprising:
a. a heavy duty structural frame;
b. lightweight panels secured to the heavy duty frame;
c. electronic voting equipment;
d. means to mount the electronic voting equipment on the frame;
e. means to move the voting booth from a storage area to a voting poll area; and
f. means for converting the voting booth from a compact storage mode to a functional voting mode
wherein the means for converting the voting booth from a compact storage mode to a functional voting mode is comprised of vertical rails on the two front edges of the voting booth; front doors hingedly and slidable mounted on the rails; means at the top of each rail to releasably hold the doors in an elevated position; a curtain hingedly mounted on the inside of each door for rotation into position to form a screen between the doors when the doors

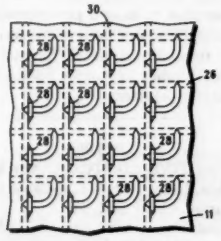
are in an open elevated position; a top and a ballot display hingedly mounted to the top.

5,073,000

OPTICAL INTERCONNECT PRINTED CIRCUIT STRUCTURE

Dennis Derfiny, Clarendon Hills, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 21, 1990, Ser. No. 526,197
Int. Cl.[5] G02B *6/10*
U.S. Cl. 385—14 **11 Claims**



1. An apparatus providing communication resources within a substrate assembly, the apparatus having:

A) a substrate;

B) a first set of at least one optical wave-guide embedded within the substrate with an optical connection at a first end of a wave-guide between the wave-guide and at least one electro-optical component mounted on such substrate; and

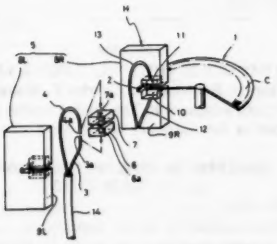
C) at least one connector containing a means for connecting and automatically aligning a second end of the at least one wave-guide within the substrate with an at least one wave-guide external to the substrate to form a resultant optical connection with such resultant optical connection used for at least one-way transmission of an optical signal between the substrate and other, external, devices.

5,073,001

PHOTOINTERRUPTOR FOR USE IN OPTICAL TRANSMISSION-TYPE ROTARY ENCODER

Seiichi Sato; Yoshi Kurosawa; Kazuo Yamaguchi, all of Tokyo; Atsushi Ueda, and Masami Matsumura, both of Hyogo, all of Japan, assignors to Optec D.D. Melco Laboratory Co., Ltd.; Optec Dai-Ichi Denko Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, all of Tokyo, Japan

Filed Oct. 26, 1990, Ser. No. 603,403
Claims priority, application Japan, Oct. 26, 1989, 1-125356[U]
Int. Cl.[5] G02B *6/26*
U.S. Cl. 385—19 **6 Claims**



1. A photointerrupter for use in an optical transmission-type rotary encoder in which a pulse scale having a code pattern formed therein is arranged to be rotated in a plane,

said photointerrupter comprising:

a light-emitting optical fiber having an end portion terminating in an end face;

a light-receiving optical fiber having an end portion terminating in an end face;

a housing having a slot means formed therein for partially enveloping said pulse scale on axially opposite sides of said plane;

a pair of optical fiber opposing members, each having an aperture formed therethrough and opening through a surface thereof;

said end portion of said light-emitting optical fiber being mounted in and extending through the respective said aperture of one of said optical fiber opposing members and having said end face thereof juxtaposed with said surface of said one of said optical fiber opposing members;

said end portion of said light-receiving optical fiber being mounted in and extending through the respective said aperture of the other of said optical fiber opposing members and having said end face thereof juxtaposed with said surface of said other of said optical fiber opposing members; and

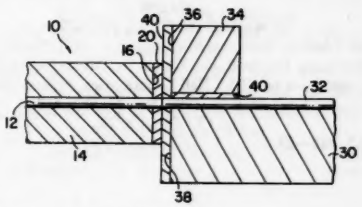
means mounting said optical fiber opposing members to said housing with said end faces of said light-emitting optical fiber and said light-receiving optical fiber spacedly confronting one another, with a gap of predetermined axial extent between them, on axially opposite sides of said plane, axially across said slot means, so that, in use, light emitted from said end face of said light-emitting optical fiber must penetrate through said pulse scale at said plane in order to be received through said end portion of said light-receiving optical fiber.

5,073,002

SELF ALIGNING PIGTAIL

Bruce D. Hockaday, 124 Merline Rd., Vernon, Conn. 06066

Filed Nov. 30, 1990, Ser. No. 621,097
Int. Cl.[5] G02B *6/30*
U.S. Cl. 385—49 **18 Claims**



13. Apparatus, comprising:

an optical fiber, having an inner core portion surrounded by an outer cladding portion, an end face of said fiber being coated with a layer of solder such that said solder layer covers a cladding portion of said fiber without covering a core portion of said fiber;

an integrated optical chip, having a waveguide imbedded in a surface thereof;

a block of integrated optical material, mounted to a surface of said chip such that a planar end face of said chip is aligned with a planar end face of said block to form a continuous end face, said continuous end face being coated with a layer of solder such that said solder layer covers entirely said continuous end face without covering said waveguide; characterized by:

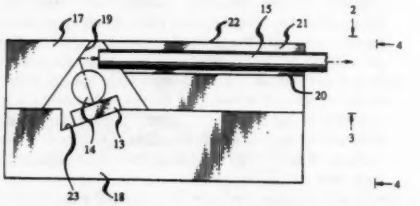
said solder coated fiber end face being attached to said solder coated continuous end face such that said fiber core and said waveguide are in approximate axial alignment, said solder coatings on said fiber end face and on said continuous end face being melted whereby resulting surface tension forces bring said optical axis along said fiber core into precise axial alignment with said optical axis of said waveguide.

5,073,003

OPTOELECTRONIC DEVICE PACKAGE METHOD AND APPARATUS

Harold R. Clark, Fanwood, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 289,093, Dec. 23, 1988, Pat. No. 5,017,263.
This application Oct. 3, 1990, Ser. No. 636,872
Int. Cl.[5] G02B *6/36*
U.S. Cl. 385—33 13 Claims



1. An optoelectronic device package comprising an optic fiber having an axis that extends in a first direction; a reflective surface; and an optoelectronic device included in an optical path that includes the axis of the optical fiber and the reflective surface, characterized in that:

the reflective surface is defined by a first crystallographic plane of a first monocrystalline element, the plane extending at a first angle with respect to the first direction;

the optoelectronic device is mounted on a second crystallographic plane of a second monocrystalline element having a crystal orientation different from that of the first monocrystalline element;

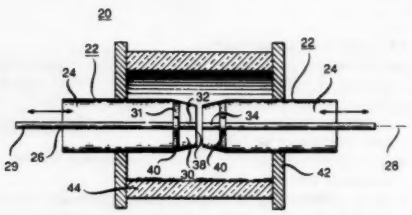
the second crystallographic plane extends at a second angle with respect to the first direction, whereby the optoelectronic device is oriented at a predetermined angle with respect to the optical path.

5,073,004

TUNABLE OPTICAL FILTER

Jane B. Clayton, Suwanee; Muhammad A. El, Lithonia; Lucius J. Freeman, Hartwell, and Calvin M. Miller, Atlanta, all of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 18, 1990, Ser. No. 525,417
Int. Cl.[5] G02B *6/38*
U.S. Cl. 385—27 11 Claims



1. A tunable optical filter which is capable of having a desired bandwidth, said filter comprising:

a first ferrule assembly having aligned passageway portions for receiving a length of optical fiber in one portion and another length in another portion thereof, the passageway portions being spaced apart by a mirror which is transverse to a longitudinal axis of the passageway portions and which is substantially closer to one end of said first ferrule assembly than to an opposite end thereof;

a second ferrule assembly having aligned passageway portions for receiving a length of optical fiber in one portion thereof and another length in another portion thereof, the passageway portions in said second ferrule assembly being spaced apart by a mirror which is normal to a longitudinal axis of said passageway portions in said second ferrule assembly, and which is substantially closer to one end of said second ferrule assembly than to an opposite end thereof;

optical fiber positioned in each passageway portion of each ferrule assembly;

supporting means for holding said first and second ferrule assemblies with the axes of the passageways aligned and with said one end of said first ferrule assembly being adjacent to said one end of said second ferrule assembly; and

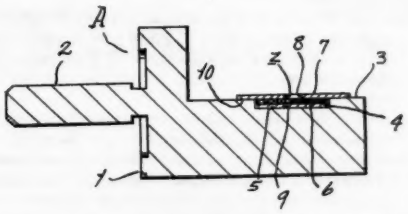
adjustable means for causing adjacent said one ends of the ferrule assemblies to have a predetermined axial spacing and for causing said one ends of the ferrule assemblies to experience translational and/or pivotal movement with respect to each other to provide a suitably low loss alignment of the optical fibers.

5,073,005

RETRO-REFLECTIVE PHOTOGRAMMETRIC TARGET

William O. Hubbs, Cedar Hill, Mo., assignor to Hubbs Machine & Manufacturing, Cedar Hill, Mo.

Filed May 2, 1988, Ser. No. 188,842
Int. Cl.[5] G02B *5/12*; G01C *15/02*
U.S. Cl. 359—515 8 Claims



1. A target for use in photogrammetry and automated theodolite systems comprising a rigid body having a flat support surface, a retro-reflective tape being of relatively thin tape-like character having a normally rearward surface and forward surface, adhesive means provided on the rearward surface of said retro-reflective tape for securing said retro-reflective tape to said support surface, light reflective means provided to the forward surface of said tape, and a mask having a rearward surface and forward surface, adhesive means provided on the rearward surface of said mask for securing said mask in overlying relationship to said light reflective means, said mask having an opening of predetermined area less than the area of the light reflective means and a cross section being greater than that of the retro-reflective tape and the light reflective means provided thereon so as to enclose the latter when the mask is in operative position.

5,073,006

COMPACT 2F OPTICAL CORRELATOR

Joseph L. Horner, Belmont, and Charles K. Makekau, Bedford, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 30, 1990, Ser. No. 502,609
Int. Cl.[5] G02B *27/42*
U.S. Cl. 359—561 4 Claims

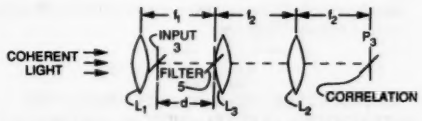
1. An optical correlator system comprising:

(a) a first Fourier transform single lens for taking the Fourier transform of a first signal representing an input image and forming said Fourier transform at a first position along an optical axis;

(b) a filter located at said first position providing information

obtained from a second signal which is to be correlated with said first signal;

(c) a second Fourier transform single lens in optical alignment with said filter for taking the inverse Fourier transform of the product of the Fourier transform of said first signal and said information of said second signal, and for forming said inverse Fourier transform at a second position along said optical axis, said inverse Fourier transform being substantially equivalent to the mathematical correlation function between said first signal and said second signal;



(d) input signal producing means positioned close to said first lens and between said first lens and said second lens for producing said first input signal behind said first Fourier transform lens to introduce a wavefront distortion quadratic phase term; and

(e) means for positioning said second Fourier transform single lens close to said filter and between said filter and said second position, said second Fourier transform single lens having a focal length which removes said quadratic phase term from said wavefront while concurrently inverse Fourier transforming the disturbance behind the filter to produce a correlation signal at said second position.

5,073,007

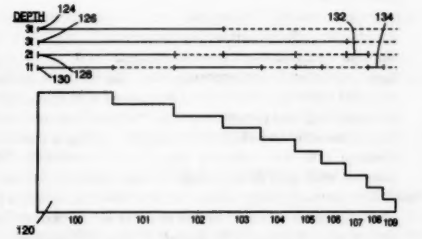
DIFFRACTIVE OPTICAL ELEMENT

Joseph Kedmi, and Israel Grossinger, both of Rehovot, Israel, assignors to Holo-Or Ltd., Rehovot, Israel

Filed Jun. 11, 1990, Ser. No. 536,177

Int. Cl.[5] G02B *27/44, 3/08*

U.S. Cl. 359—565 **14 Claims**



1. A diffractive optical element comprising:

a base; and

at least one phase zone comprising an arbitrary multiplicity M of steps of identical step height wherein said multiplicity is not a power of 2 and wherein said steps are generated using a number of binary masks with said number of masks being equal to the smallest integer greater than $\log_2 M$.

5,073,008

MULTICOLOR INTERFERENCE FILTERS WITH SIDE SURFACES TO PREVENT ENTRY OF UNDESIRABLE LIGHT

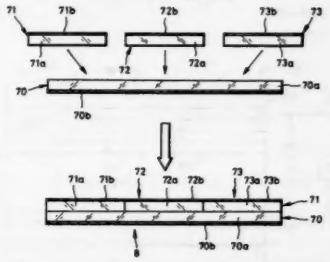
Takaaki Terashita, and Setsuo Okada, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 282,368, Dec. 9, 1988, abandoned. This application Mar. 14, 1991, Ser. No. 668,331

Claims priority, application Japan, Dec. 11, 1987, 62-313761; Dec. 11, 1987, 62-313762; Dec. 11, 1987, 62-313763

Int. Cl.[5] G02B *5/28*

U.S. Cl. 359—589 **15 Claims**



3. A multi-color interference for preventing entry of undesirable light, comprising:

at least two interference filters, having different spectral characteristics, closely connected and horizontally adjacent to each other and cemented on a transparent base support;

wherein said transparent base support has a multi-coated anti-reflection layer deposited on one surface opposite to a surface to which said interference filters are cemented.

5,073,009

LAMINATED BEAM SPLITTING OPTICAL SYSTEM WITH REFLECTIVE MEDIUM

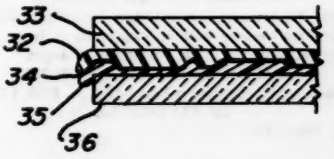
Murray Tovi, Colorado Springs, Colo., assignor to Theoretical Optics, Inc., Colorado Springs, Colo.

Continuation-in-part of Ser. No. 362,691, Jun. 7, 1989, Pat. No. 4,934,792. This application Jun. 15, 1990, Ser. No. 540,575

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.[5] G02B *27/00; G02C 7/10*

U.S. Cl. 359—601 **16 Claims**



1. A method of making an optical layered structure having irregularities on a surface contained therein, so that an image of said surface irregularities is reflected, while permitting coherent light transmission through said structure, comprising:

providing a first clear hardenable plastic layer having irregularities on a first surface thereof;

applying a first transparent medium to a surface of said first plastic layer opposite said first surface;

applying a second clear hardenable plastic layer to fill in the irregularities on said first surface of said first plastic layer;

applying one surface of a second transparent medium directly to the second plastic layer in adhering relationship thereto, where one of the opposing surfaces of the second transparent medium is smooth and becomes the outside

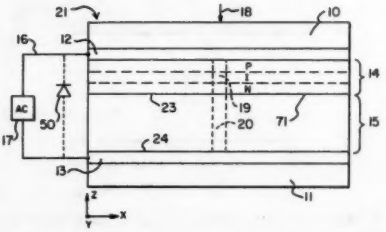
surface of said optical layered structure formed by the first transparent medium, the first and second plastic layers, and the second transparent medium.

5,073,010

OPTICALLY ADDRESSABLE SPATIAL LIGHT MODULATOR HAVING A DISTORTED HELIX FERROELECTRIC LIQUID CRYSTAL MEMBER

Kristina M. Johnson; Chongchang Mao, and Ibrahim S. Abdulhalim, all of Boulder, Colo., assignors to University of Colorado Foundation, Inc., Boulder, Colo.

Filed May 11, 1990, Ser. No. 522,609
Int. Cl.[5] G02F *1/13*
U.S. Cl. 359—72 **37 Claims**



1. A spatial light modulator operable to be written by a source of writing electromagnetic radiation and to be read by a source of reading electromagnetic radiation, the modulator comprising;

a pair of physically spaced electrically conductive films that are transparent to the writing/reading electromagnetic radiation, said conductive films being located in confronting relation to each other,

an electromagnetic radiation sensitive film on one of the conductive films in confronting relation to the other of said conductive films,

a distorted helix ferroelectric liquid crystal film confined between said other conductive film and said radiation sensitive film, and

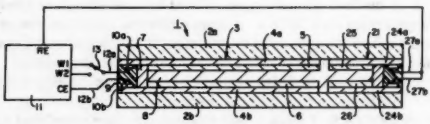
voltage supply means connected to said two conductive films, said voltage supply means comprising a source of AC voltage having a peak to peak magnitude of about 3 to 7 volts.

5,073,011

ELECTROCHROMIC DEVICE WITH A REFERENCE ELECTROCHROMIC ELEMENT

Toshiyasu Ito, Kasugai; Takaaki Mori, Inazawa; Mamoru Kato, and Toshiya Uemura, both of Nagoya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Oct. 30, 1990, Ser. No. 605,359
Claims priority, application Japan, Oct. 31, 1989, 1-127326[U]
Int. Cl.[5] G02F *1/01*
U.S. Cl. 359—265 **9 Claims**



1. An electrochromic device comprising:

a pair of bases;

a primary electrochromic element disposed between said bases;

a reference electrochromic element disposed between said bases for generating a predetermined reference voltage to be utilized in the control of the primary electrochromic element, wherein both said primary and reference electrochromic elements include,

a pair of electrodes, at least one of which is transparent,

an electrolyte disposed between said pairs of electrodes, and

color-developing materials provided between said electrodes, the color-developing materials including an oxidation color-developing layer and a reduction color-developing layer, wherein the oxidation and reduction color developing layers in said reference electrochromic element are short circuited to provide the reference voltage; and

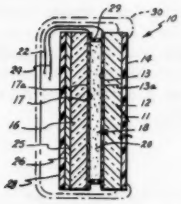
a power regulator for driving said primary electrochromic element using driving signals, a potential of the driving signals provided by said power regulator being influenced by said reference voltage.

5,073,012

ANTI-SCATTER, ULTRAVIOLET PROTECTED, ANTI-MISTING, ELECTRO-OPTICAL ASSEMBLIES

Niall R. Lynam, Holland, Mich., assignor to Donnelly Corporation, Holland, Mich.

Continuation of Ser. No. 155,256, Feb. 12, 1988, abandoned.
This application Mar. 20, 1990, Ser. No. 496,271
Int. Cl.[5] G02F *1/13*; G02B *17/00*
U.S. Cl. 359—265 **39 Claims**



1. An anti-lacerative, scatter protected, laminate, electro-optic rearview mirror assembly adapted to reduce laceration injuries and scattering of glass fragments if damaged or broken comprising:

first and second spaced, optically transparent elements mounted in a mirror case, said elements each having front and rear surfaces and defining a space between the rear surface of said first element and the front surface of said second element;

an electro-optic medium confined in said space whose light transmittance is variable upon the application of an electric field thereto;

means for applying an electric field to said electro-optic medium to cause variation in the light transmittance of said medium;

a reflective coating on one surface of said second element adapted to reflect light incident thereon through said first element and said electro-optic medium; and

a layer of optically transparent, tear/perforation resistant material adhered to said front surface of said first element for retaining and preventing scattering of fragments from said element in the event of damage/breakage of said first element and for reducing the risk of laceration from contact with said first element when damaged/broken;

said first element being a laminate assembly including a pair of glass panels adhered to one another by a polymer layer which also reduces UV radiation transmittance to said assembly and electro-optic medium;

said layer of transparent, tear/perforation resistant material being adhered to the front surface of the outermost of said pair of glass panels, reducing UV transmission to said assembly, and being selected from the group including reticulated polyurethane and a composite including a layer of polyvinylbutyral and a layer of polyester.

5,073,013

PROJECTION-TYPE DISPLAY DEVICE

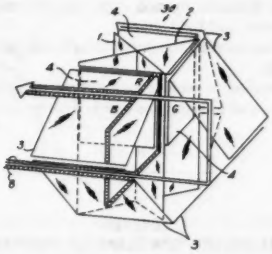
Tomio Sonehara; Shuji Aruga, and Shinji Morozumi, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Division of Ser. No. 786,438, Oct. 11, 1985, abandoned. This application Oct. 19, 1989, Ser. No. 424,021

Claims priority, application Japan, Oct. 22, 1984, 59-221556; Jul. 31, 1985, 60-169442

Int. Cl.[5] G02F *1/13*; G02B *27/28*

U.S. Cl. 359—63 5 Claims



1. A projection-type display device comprising a light source for producing light, color segregating means for receiving said light and segregating said light into at least two different colored lights, color modulating means having at least two light valves each of which receives one of said colored lights, modulates said colored lights and generates color images in response thereto, color synthesizing means including at least two dichroic optical elements for synthesizing said color images, and projection means for projecting said synthesized image, each modulated colored light having a polarization axis, said light incident to and said light outputted from said color synthesizing means each having an optical axis, said polarization axes of said modulated color lights being substantially perpendicular to a plane formed by the optical axis of the light incident to said color synthesizing means and the optical axis of the light outputted from said color synthesizing means when said colored lights are reflected at least once at said dichroic optical elements, the polarization axes of said modulated color lights being substantially parallel to said plane when said colored lights are transmitted through said dichroic optical elements.

5,073,014

HIGHLY EFFECTIVE POLARIZERS

Karl-Heinz A. Ostoja-Starzewski, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 5, 1990, Ser. No. 475,041

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1989, 3905519

Int. Cl.[5] G02B *5/30*; B29D *11/00*

U.S. Cl. 359—490 16 Claims

1. A highly effective polarizer having a stretch ratio ϵ of more than 300%, which is made from a polyacetylene-containing polymer product having a matrix of pure polyvinylalcohol (PVS) with a degree of saponification of 90–100% and with a maximum degree of polarization P of at least 95% and a dichoric ratio Q_E over almost the entire wavelength range of visible light, from 400 to 800 nm, of Q_E=quotient of the extinction in the blocked position to the extinction in the transmission position=10 or greater in the form of a stretched film.

5,073,015

ZOOM LENS SYSTEM

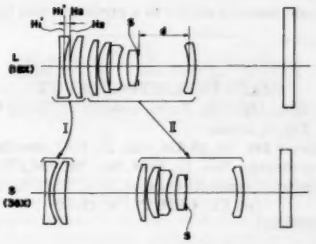
Toshihiko Ueda, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 20, 1990, Ser. No. 632,086

Claims priority, application Japan, Dec. 26, 1989, 1-337677

Int. Cl.[5] G02B *15/177*

U.S. Cl. 359—680 3 Claims



1. A zoom lens system comprising, in order from the enlarging side:

a negative lens group including a negative lens having a concave surface facing the reducing side and a positive lens having a convex surface facing the enlarging side; and

a positive lens group including a positive lens unit of at least one single positive lens having a convex surface facing the enlarging side, a first lens having a concave surface facing the reducing side, a double convex lens, and a second lens having a concave surface facing the enlarging side;

wherein said zoom lens system satisfies the following conditional expression:

$$0.35 < f_{II}/F_L < 0.55$$

$$0.10 < d/f_L < 0.50$$

wherein F_{II} is a focal length of said positive lens group, F_L is an overall focal length at the maximum focal length end, and a d is an air space between said double convex lens and said second lens.

5,073,016

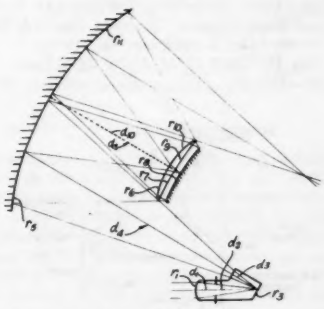
LENS SYSTEM FOR COMPACT CAMERA

Elliot M. Burke, Santa Barbara, Calif., assignor to Medical Concepts, Inc., Goleta, Calif.

Filed Aug. 27, 1990, Ser. No. 572,700

Int. Cl.[5] G02B *17/00*

U.S. Cl. 359—727 10 Claims



1. A lens comprising, in combination:

(a) an input lens having a focal length and including a simple lens for receiving an image;

(b) said input lens including a mirrored back surface, said

mirrored surface being concave for optically flattening the received image and projecting said flattened virtual image in a predetermined direction;

(c) a concave mirror for reflecting said virtual image to a Mangin mirror; and

(d) said Mangin mirror being positioned in opposed relation to said concave mirror and at the aperture stop of said lens system so that said image is reflected from the back surface thereof to said concave mirror and then reflected from said concave mirror to a predetermined focus.

5,073,017

IMAGE DEFLECTING DEVICE

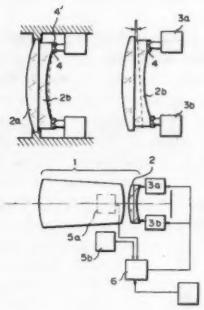
Shigeyuki Suda, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 18,426, Feb. 25, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 434,578

Claims priority, application Japan, Mar. 1, 1986, 61-45112

Int. Cl.[5] G02B *27/64, 15/00*

U.S. Cl. 359—557 **14 Claims**



8. A photo-taking system including:

a photo-taking lens means for forming the image of an object;

detection means for detecting an inclination of said photo-taking lens means and outputting a detection signal which represents an amount of displacement; and

means for actively and selectively inclining a surface of a rearmost lens of said photo-taking lens in accordance with the detection signal output of said detection means.

5,073,018

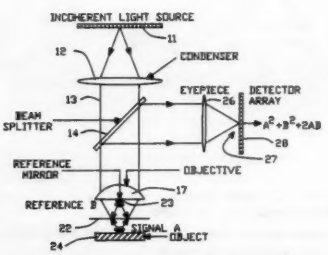
CORRELATION MICROSCOPE

Gordon S. Kino; Stanley S. C. Chim, and Patricia A. Beck, all of Santa Clara, Calif., assignors to The Board Of Trustees Of The Leland Stanford Junior University, Stanford, Calif.

Filed Oct. 4, 1989, Ser. No. 419,521

Int. Cl.[5] G02B *27/14, 21/08;* **G01B** *9/02*

U.S. Cl. 359—368 **11 Claims**



1. A correlation microscope comprising

a condenser lens for receiving light from a light source and forming a collimated beam,

a wide aperture objective lens for receiving and focusing said collimated beam,

a beam splitter comprising a pellicle having a thickness less than 1000 Å for receiving said focused beam and passing a portion of said focused light to focus on an object plane where it is reflected by an object placed at said plane,

a mirror mounted on said objective lens positioned to receive the focused light reflected by said pellicle and reflecting it back toward said pellicle,

said objective lens receiving light reflected by said mirror and light reflected by said object ad directing the light back toward said light source,

means for intercepting the directed light and redirecting the light, and

a lens positioned to receive said redirected light and focus the light on an image plane where it forms an interference image.

5,073,019

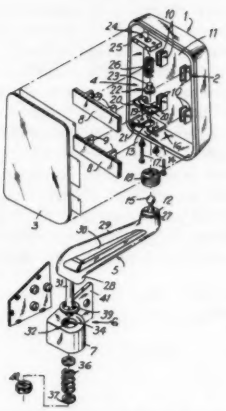
EXTERNAL REAR VIEW MIRROR ASSEMBLY FOR VEHICLES

Antonio Ferreira do Espírito Santo, Sao Paulo, Brazil, assignor to Metagal Industria e Comercio Ltda., Sao Paul, Brazil

Filed Jan. 10, 1990, Ser. No. 462,759

Int. Cl.[5] G02B *7/18;* **B60R** *1/06*

U.S. Cl. 359—872 **2 Claims**



1. An external rear view mirror assembly for vehicles, comprising a frame; a mirror; means for securing said mirror in said frame; a base for securing said frame to a vehicle body; lever means for rotatably connecting said frame to said base; and articulation means for pivotally attaching said frame to said lever means; said lever means including a lever having an intermediate hollow section and two end sections extending vertically at opposite ends of said intermediate hollow section, and rotating means rotatably connecting one of said two end sections with said base, said base having a seat, said rotating means including a stub projecting from said one of said two end sections in said seat of said base, a crown secured to said stub and having radial cut-outs, a washer spaced from said crown and secured in an annular groove formed in said stub, a pin extending transversely through said stub and engaging said cut-outs in said crown, and a coil spring extending between said crown and said washer and surrounding said stub, said stub having a threaded end portion to be received in a nut.

5,073,020

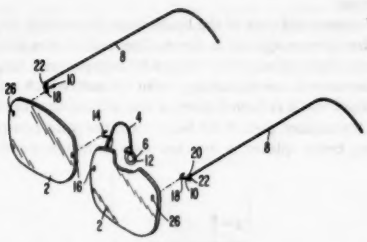
EYEGLASSES HAVING OBLONG RECEIVING MEANS

Poul J. Lindberg, Egaa, and Hans Dissing, Copenhagen, both of Denmark, assignors to Paul Jorn Lindberg, Egaa, Denmark

Continuation of Ser. No. 533,814, Jun. 6, 1990, abandoned, which is a continuation of Ser. No. 231,539, Aug. 12, 1988, abandoned. This application Dec. 27, 1990, Ser. No. 634,764

Int. Cl.[5] G02C *1/04, 1/02, 5/14*

U.S. Cl. 351—106 13 Claims



1. Eyeglasses having a pair of adjacent lens means and frame means comprising holding means for engaging the lens means, said frame means being fashioned of a wire, said holding means including bent loop wire portions projecting straightforwardly from the frame means, said lens means including mounting slits disposed at a position spaced from an outer peripheral edge of the lens means for respectively receiving said bent loop wire portions, each of said slits having a substantially oblong configuration corresponding to a cross-sectional shape of the bent loop wire portions such that the bent wire portions and the slits provide the sole connection between the lens means and the frame means, with the bent loop wire portions being resiliently squeezed between opposed narrow end portions of said slits thereby ensuring a firm releasable securement between the lens means and the frame means.

5,073,021

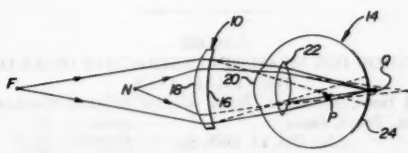
BIFOCAL OPHTHALMIC LENS CONSTRUCTED FROM BIREFRINGENT MATERIAL

Joseph C. Marron, Brighton, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Mar. 17, 1989, Ser. No. 324,827

Int. Cl.[5] G02C *7/06, 7/04;* G02B *5/30;* A61F *2/16*

U.S. Cl. 351—168 9 Claims



1. An ophthalmic lens formed of birefringent material supported with its central axis coincident with the user's visual axis and with the fast and slow axes of the birefringent material perpendicular to the visual axis, so as to provide one focal length for light polarized parallel to the fast axis and a second focal length for light polarized parallel to the slow axis.

5,073,022

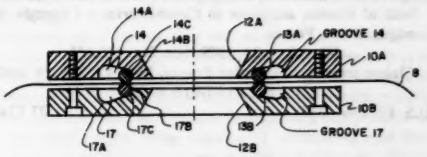
PRESSURE ACTIVATED FILM TENSIONER

Helmut H. Pistor, Fairfax, and James C. Brown, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 19, 1990, Ser. No. 628,829

Int. Cl.[5] G03B *1/48*

U.S. Cl. 352—223 2 Claims



1. A film tensioner for controlling film flatness comprising:

two parallel film holder plates having centrally located and matching apertures therein, each plate having at least one specifically configured elongated groove on the respective interfacing surface of each respective plate conforming with the shape of the aperture and adapted to receive an O-ring;

an O-ring integral with and conforming to the specifically configured groove in each plate, constrained from movement inwardly by the innermost shoulder of the elongated groove;

means for applying transverse pressure across the two film holder plates whereby film placed between said plates is held taut by static friction from the O-rings and whereupon, as the pressure is applied transversely to said holder plates, the interfacing O-rings are caused to deform, thereby providing a lateral biasing movement outwardly in all directions from the center portion of the area of the film under tension, for effecting a uniform tension across the film to produce a flat film surface.

5,073,023

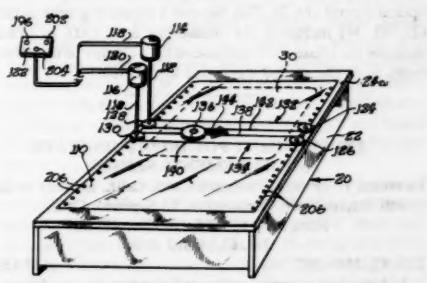
OVERHEAD PROJECTOR DISPLAY

Alvan D. Arsem, 25 Northledge Dr., Snyder, N.Y. 14226

Filed Jan. 4, 1990, Ser. No. 460,996

Int. Cl.[5] G03B *21/132*

U.S. Cl. 353—42 5 Claims



1. Apparatus for projecting transparencies including a housing having means providing a projection light path, a projection optical system in said light path interconnected with said housing, means connected to said housing for supporting a transparency to be projected in said light path, masking means interconnected with said housing and disposed across said light path, and means for moving said masking means selectively to uncover portions of said transparency while covering other portions thereof and thus to project only selected portions of said transparency at any given time, and further including an indicating member disposed in said light path, means providing an axis of rotation for said member lying in said light path and oriented in the same direction as said light path, and means for

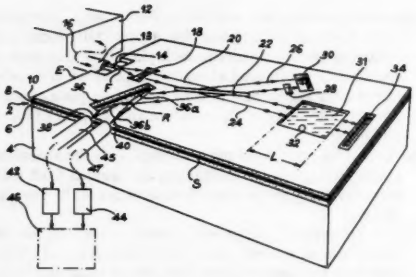
moving said member rectilinearly and also rotationally about said axis of rotation to point at a selected area of said transparency from any direction to direct attention to a selected area of said transparency.

5,073,024

INTEGRATED OPTICAL DEVICE FOR MEASURING THE REFRACTIVE INDEX OF A FLUID

Serge Valette, Grenoble, and Stéphane Renard, Champ sur Drac, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 24, 1989, Ser. No. 426,425
Claims priority, application France, Nov. 4, 1988, 88 14433
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—345 **23 Claims**



1. An integrated optical device for measuring the refractive index of a fluid comprising (a) a light guide (**2**) corresponding to an effective index n_1 of the guided mode, formed on a substrate (**4**) and having a guiding layer (**8**) for carrying light beams (**16**, **24**, **26**, **38**, **40**), inserted between a lower layer (**6**) and an upper layer (**10**) having refractive indices below that of the guiding layer (**8**), (b) an interaction measuring zone (**32**) of the light guide to be in contact with the fluid (**31**), the upper layer level (**10**) with the measuring zone having a thickness (h') smaller than the penetration distance of the evanescent wave of the guided light beam and outside said interaction zone a thickness (h) greater than the penetration distance of said same evanescent wave, and (c) an interferometric optical system, at least partly formed in the light guide and having a reference optical circuit (**22**, **28**, **28*a***, **30**) and a measuring optical circuit (**22**, **32**, **34**) including the measuring zone (**32**), in order to measure the phase shift introduced by a change to the effective index n_2 of the guided mode due to the fluid.

5,073,025

INDEPENDENT POLARIZATION STATE MEASUREMENTS SENSOR

Lawrence D. Brooks, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 8, 1989, Ser. No. 433,887
Int. Cl.[5] G01J *4/04*
U.S. Cl. 356—367 **2 Claims**

1. A method of mapping the polarization across a laser beam comprising, splitting a laser beam into six portions to be measured, each portion having a different polarization, by first passing the laser beam through a first non-polarizing beam splitter which transmits part of the beam and reflects part of the beam,

the transmitted part is directed to a first polarizing beam splitter which splits the beam into a first portion having a polarizing of 0 degrees and a phase of 0 degrees and a second portion having a polarization of 90 degrees and a phase of 0 degrees.

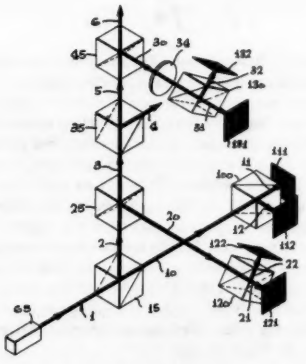
the reflected part of the beam from the first non-polarizing beam splitter is directed to a second non-polarizing beam splitter which transmits part of the beam and reflects part of the beam,

the second non-polarizing beam splitter is rotated 90 degrees with respect to the first non-polarizing beam splitter,

the reflected beam from the second non-polarizing beam splitter is directed to a second polarized beam splitter which is rotated 45 degrees on its optical axis so as to split the incoming beam into two beams a third portion polarized at 45 degrees and a phase of 0 degrees and a fourth portion polarized at −45 degrees with a phase of 0 degrees.

the transmitted part of the beam from the second non-polarizing beam splitter is directed to a third non-polarizing beam splitter which is rotated 90 degrees with respect to the second non-polarizing beam splitter, which splits the beam into a reflected portion and a transmitted portion,

the transmitted part of the beam from the third non-polarizing beam splitter is directed to a fourth non-polarizing



beam splitter which is rotated 90 degrees with respect to the first non-polarizing beam splitter.

the reflected beam from the fourth non-polarizing beam splitter is directed through a quarter wave plate to a third polarizing beam splitter which is rotated 45 degrees on its optical axis and splits the incoming beam into two beams, a fifth portion which has a polarization of −45 degrees with a phase of 90 degrees and a sixth portion which has a polarization of 45 degrees and a phase of 90 degrees,

measuring the intensity of the cross sections of each polarized portion of the laser beam by use of an array of pixels in a charge coupled device,

aligning the pixels in each charge coupled device so that the pixels measuring the same portion of the laser beam are matched,

combining the data from each matched pixel int h charge coupled device into a mapping of the polarization of a laser beam by use of a computer and the proper algorithm to map the polarization across the laser beam.

5,073,026

METHOD FOR MEASURING REFRACTIVE INDEX OF THIN FILM LAYER

Tami Isobe, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 13, 1988, Ser. No. 256,991
Claims priority, application Japan, Feb. 5, 1988, 63-25128; Sep. 12, 1988, 63-228199; Sep. 12, 1988, 63-228200
Int. Cl.[5] G01N *21/21*
U.S. Cl. 356—369 **9 Claims**

1. A method for measuring a refractive index of a thin film layer formed on a substrate comprising the steps of:

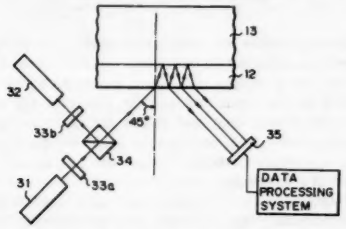
(a) irradiating a P-polarized monochromatic light and an

S-polarized monochromatic light on said thin film layer at a predetermined angle of incidence;

(b) measuring intensities of said P-polarized and S-polarized monochromatic lights reflected on said thin film layer;

(c) determining respectively a reflectance R_p of said reflected P-polarized monochromatic light and a reflectance R_s of said reflected S-polarized monochromatic light on the basis of said measured intensities of said P-polarized and S-polarized monochromatic lights;

(d) determining a first phase difference $(\phi_{23p}-\phi_{23s})_1$ between a phase change of said irradiated P-polarized monochromatic light ϕ_{23p}, which phase change is caused when said irradiated P-polarized monochromatic light is reflected at an interface between said thin film layer and said substrate, and a phase change of said irradiated S-polarized monochromatic light ϕ_{23s}, which phase change is caused when said irradiated S-polarized monochromatic light is



reflected at said interface, as a function of said refractive index of said thin film layer n_2 by using a known wavelength of said P-polarized and S-polarized monochromatic lights λ, said predetermined angle of incidence θ_1, a known refractive index of an incident medium n_1, a known refractive index of said substrate n_3, said determined reflectance R_p, and said determined reflectance R_s, to thereby obtain a function of $\eta(n_2)=(\phi_{23p}-\phi_{23s})_1$;

(e) determining a second phase difference $(\phi_{23p}-\phi_{23s})_2$ between said phase change ϕ_{23p} and said phase change ϕ_{23s} as a function of said refractive index n_2 by using said wavelength λ, said angle of incidence θ_1, said refractive index n_1, and said refractive index n_3, to thereby obtain a function of $\epsilon(n_2)=(\phi_{23p}-\phi_{23s})_2$;

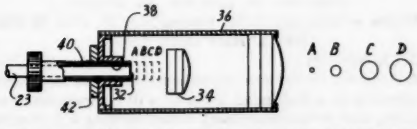
(f) determining a value of n_2 which satisfies the following equation as a value of said refractive index of said thin film layer, $\eta(n_2)=\epsilon(n_2)$.

5,073,027

FIBER OPTIC DISPLACEMENT MEASURING APPARATUS

David A. Krohn, Hamden, and Edmond I. Vinarub, Cheshire, both of Conn., assignors to 3M Fiber Optic Products, Inc., St. Paul, Minn.

Continuation of Ser. No. 907,726, Sep. 15, 1986, abandoned. This application May 23, 1989, Ser. No. 356,676
Int. Cl.[5] G02B 5/16
U.S. Cl. 356—373 **5 Claims**



1. For use with optical apparatus for determining the displacement or position of an object which comprises a light source and a light receiver for receiving light transmitted from said light source and a fiber optic conduit of Y-shaped configuration having the end of one arm thereof positioned adjacent said light source and the end of the other arm positioned adjacent said light receiver, said conduit arms forming a common bundle of optically conducting fibers in the base of said Y, some of which fibers are transmitting fibers for conducting light from said light source to a surface of said object and some of which are receiving fibers for conducting light reflected from the surface of said object to said light receiver so that said conduit is normally operative to conduit light from said light source and to conduct reflective light impinging on an end face of said common bundle to said light receiver, the improvement comprising

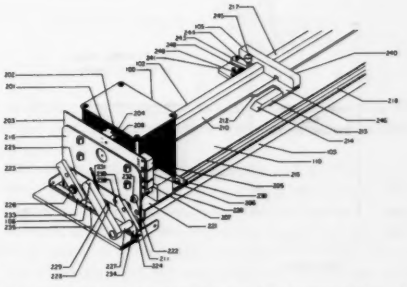
a sensing head having one end adapted to be positioned adjacent the surface whose displacement or position is to be measured, said sensing head including lens means and means for adjusting the position of said lens means relative to said end face, said means for adjusting the position of said lens means being capable of positioning said lens means so as to focus the image of said end face at infinity.

5,073,028

SCANNING DENSITOMETER

David R. Bowden; Ross A. Ouwinga, both of Grand Rapids, and Lawrence D. Zandstra, Rockford, all of Mich., assignors to X-Rite, Incorporated, Grandville, Mich.

Filed Apr. 23, 1990, Ser. No. 512,856
Int. Cl.[5] G01J 3/51
U.S. Cl. 356—402 **19 Claims**



1. A densitometer for measuring color characteristics of an object sample under test, comprising:

an autonomously operating densitometer head comprising scanning means for generating electrical output signals representative of color characteristics of a scanned sample, memory means, control means for storing data representative of said electrical output signals in said memory means, optical coupler means for transmitting and receiving optical signals, an electrical power source and means connectable to an electrical connector for charging said power source;

a densitometer support arrangement comprising a pair of essentially parallel transport bars for slidably supporting said densitometer head, stop means disposed along said transport bars, means for raising and lowering said transport bars including a pair of rotatable shafts supporting said transport bars and a plurality of lever arms attached at each end of said shafts and a pair of links for interconnecting pairs of said lever arms at opposite ends of said shafts for concomitantly raising and lowering opposite ends of said transport bars;

communication interface means mounted in proximity of one end of said transport bars and comprising means for connection to a host computer and interface optical coupler means responsive to electrical signals from said host computer to transmit optical signals and responsive to received optical signals to transmit electrical signals to said host computer;

said densitometer head further comprising drive means en-

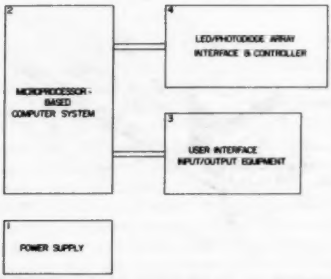
gaging at least one of said transport bars, said control means responsive to an optical signal received via said optical coupler to control said drive means to move said densitometer head along said transport bars in the direction of said stop means, said control means responsive to electrical output signals from said scanning means for storing data representative of electrical signals representing color density readings obtained from said scanner while said densitometer head is moved along said transport bars, means responsive to detection of proximity of said limit stop to control said drive means to move said densitometer head toward said one end of said transport bars and means for detecting proximity of said one end of said transport bars, said control means responsive to detection of said one end of said transport bars for transmitting an optical signal to said optical coupler and responsive to an optical signal from said interface optical coupler to transmit optical signals representative of said stored data.

5,073,029

MULTISOURCE DEVICE FOR PHOTOMETRIC ANALYSIS AND ASSOCIATED CHROMOGENS

James P. Eberly, and Ralph A. Magnotti, Jr., both of Cincinnati, Ohio, assignors to EQM Research, Inc., Cincinnati, Ohio

Filed Feb. 16, 1990, Ser. No. 481,450
Int. Cl.[5] G01N *21/59, 1/10, 33/48*
U.S. Cl. 356—432 **12 Claims**



1. An optoelectronic instrument for measuring the absorbance of a plurality of samples, comprising:

a plurality of LED-photodetector pairs, each of the said pairs being internally aligned so that light emitted by the said LED member is directed toward the photoreceptive surface of the corresponding said photodetector member of said pair, the said plurality of LED-photodetector pairs being arranged to form a spatial array of adjacent pairs,

means for removably positioning said plurality of samples so that each said sample is positioned between the said LED member and the said corresponding photodetector member of a said pair, so that the light from the LED member of such pair passes through the said sample before striking the said photodetector member of said pair,

electronic means for sequentially pulsing the LED members of said array, said sequential pulsing occurring in a sequence such that when absorbance of any particular said sample is being measured, the particular said LED member which corresponds to the said particular sample emits light, while said LED members which correspond to samples adjacent to said particular sample do not emit light simultaneously with said particular LED member, and

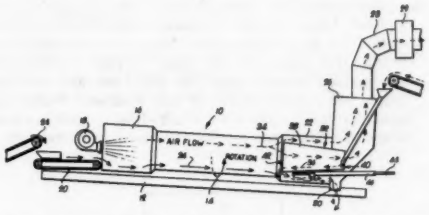
electronic means for sequentially measuring the signal from each said photodetector during the interval in which its corresponding said LED member is emitting light, and calculating the absorbance or transmittance of corresponding said sample.

5,073,030

DRUM APPARATUS FOR MIXING ASPHALT COMPOSITIONS

Edgar N. Banks, 9121 S. Shrout Rd., Grain Valley, Mo. 64029

Filed Jan. 25, 1990, Ser. No. 469,949
Int. Cl.[5] B28C *5/20*
U.S. Cl. 366—25 **14 Claims**



1. In an apparatus for heating and mixing asphalt-aggregate composition including an elongated rotatable drum having an input end and an output end, means for supplying hot gases to the drum at the input end and for directing the hot gases toward the output end, and means for supplying aggregate particles into the drum adjacent the input end and for conveying the aggregate particles toward the output end, the improvement comprising:

feeding means for introducing recycled asphalt pavement particles into the drum at a position adjacent the output end of the elongated drum and for moving the recycled asphalt pavement particles within the elongated rum in a direction counter to the direction of flow of the hot gases so that the hot gases heat the recycled asphalt pavement particles during travel of the recycled asphalt pavement particles within the elongated drum,

the feeding means including an inner drum mounted for rotation with the elongated drum and having an inlet end, an outlet end disposed intermediate the input and output ends of the elongated drum, and means for moving the recycled asphalt pavement along the inner drum from the inlet end toward the outlet end during rotation of the inner drum such that recycled asphalt pavement particles moving along the inner drum fall from the outlet end of the inner drum into the elongated drum and mix with the aggregate particles that are introduced into the drum adjacent the input end, the mixed recycled asphalt pavement particles and aggregate particles moving together in a direction parallel to the direction of flow of the hot gases toward the output end of the elongated drum; and

introduction means for introducing liquid asphalt cement into the drum at a position downstream of the outlet end of the inner drum in the direction of travel of the hot gases.

5,073,031

CONTINUOUS MANUFACTURE OF AN EMULSION IN DISCRETE QUANTITIES

Monique Wenmaekers, 22bis Avenue de Suffren; Wenmaekers Edmond, 2, 4 Avenue P. Déroulède, and Paul Wenmaekers, 22bis Avenue de Suffren, all of 75015 Paris, France

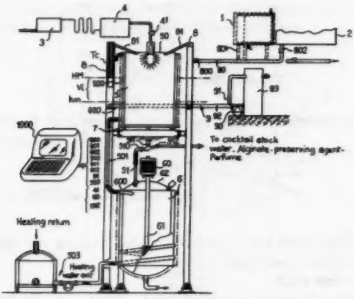
Filed May 30, 1989, Ser. No. 358,683
Claims priority, application France, May 31, 1988, 88 07221
Int. Cl.[5] B01F *15/06, 15/04*
U.S. Cl. 366—144 **13 Claims**

1. A device for the continuous manufacture of an emulsion comprising, in a first liquid, a plurality of components in suspension, said device comprising means forming a first melter for bringing said components into the liquid state so as to form a plurality of second liquids, means bringing a determined quantity of said first liquid to emulsion temperature, a second melter in the form of a metering melter, said metering melter receiving the said components in liquid form and the first liquid

in a mass proportion, said metering melter additionally bringing its contents to emulsion temperature, and an emulsion vessel receiving said quantity of the first liquid and the contents of said metering melter, said emulsion vessel being equipped with means producing the emulsion, in which said metering melter comprises:

a main vessel coupled with an electronic balance, said main vessel being connected by connecting pipework to said emulsion vessel;

means for feeding said metering melter with second liquids,



said means of feeding consisting of a plurality of metering elementary feeding means of different flow rate, each of said elementary feeding means being linked in its upper part to said means for bringing said components to the liquid state so as to form a plurality of second liquids;

means for feeding said metering elementary feeding means, in the lower part of the latter, with a fluid for floating said second liquids, said means for feeding a floating fluid feeding said metering melter with second liquids by overflowing when commanded by the change in the floating level of said second liquids.

5,073,032

MIXING DEVICE FOR BULK IMPREGNATION OF PARTICULATE MATTER BY A BINDER

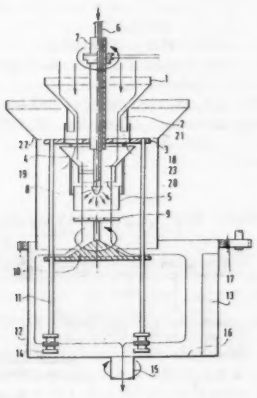
Roland Berion, Nods, and Dominique Garnier, Poissy, both of France, assignors to Efisol, Paris, France

Filed Nov. 30, 1990, Ser. No. 620,647

Claims priority, application France, Nov. 20, 1989, 89 15170

Int. Cl.[5] B01F *5/04*

U.S. Cl. 366—168 **6 Claims**



1. A device for mixing particulate matter and liquids comprising a rotatable shaft passing through a stationary particle feed hopper, the said shaft supporting a perforated rotatable plate and having a liquid feed conduit terminating in an atomizer passing therethrough, a spray chamber into which said atomizer discharges, and a rotating assembly made up by an agitator located below the spray chamber and by a conically-shaped particle catching and spreading tray.

5,073,033

LIQUID MIXER

Stanley J. Klepeis, 11 High Acres Dr., Poughkeepsie, N.Y. 12603

Filed Nov. 15, 1989, Ser. No. 436,656

Int. Cl.[5] B01F *7/16*

U.S. Cl. 366—343 **6 Claims**

1. A mixing attachment that is adapted to connect to a turning means that functions to rotate said attachment, said mixing attachment comprising:

a shaft having a bottom end and a top end wherein said top end defines an upper portion of said attachment and includes a connecting means for connecting to a complementary connecting means located in said turning means;

a blade mounted to said shaft proximate its bottom end, said blade having two opposite diagonal corners and a flat central portion located between said corners wherein said two corners are inclined upward relative to a plane formed by said central portion of said blade and said blade having a plurality of through-holes in said inclined corners whereby when the attachment is being used to mix a container's contents, portions of said contents can pass through said through-holes in the blade; and

wherein said central portion of said blade has a rhombold shape and each of said inclined corners has a triangular shape.

5,073,034

SINGLE THERMISTOR/ANALOG CONVERTER SUBSTITUTE FOR A DUAL THERMISTOR NETWORK

Anthony V. Beran, 3118 Apline, Santa Ana, Calif. 92704, and Gordon Shigezawa, 34 Cresthaven, Irvine, Calif. 92714

Filed Jun. 12, 1990, Ser. No. 537,030

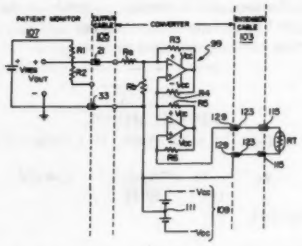
Int. Cl.[5] G71K *7/22*

U.S. Cl. 374—183 **10 Claims**

1. An electrical circuit for adapting a single thermistor to simulate the resistance of a dual thermistor circuit, said resistance of said dual thermistor circuit varying with temperature in a manner different from the resistance of said single thermistor, said electrical circuit comprising:

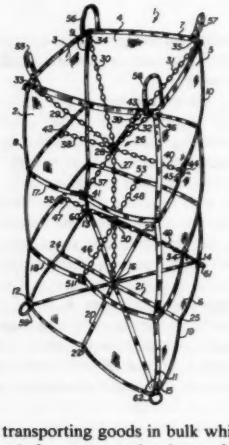
means for multiplying the resistance of the single thermistor to approximate the scale of the change in resistance with temperature of the dual thermistor circuit resulting in a scaled resistance versus temperature curve; and

means for shifting and altering the slope of said scaled resistance versus temperature curve to cause said curve to



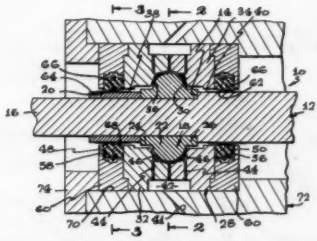
match the change in resistance with temperature of the dual thermistor circuit.

5,073,035
BULK CARRYING BAG
Kenneth J. Williams, 12 W. McCabe Rd., El Centro, Calif. 92243
Filed May 9, 1991, Ser. No. 697,412
Int. Cl.[5] B65D *33/02, 33/14*
U.S. Cl. 383—19 **7 Claims**



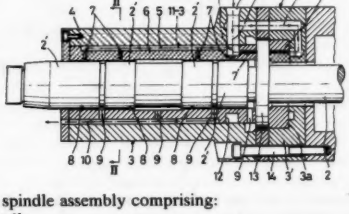
1. A bag for transporting goods in bulk which comprises:
a container made from rectangular sheets of pliable material, said container having four walls defining four vertical corners and a quadrangular bottom forming four horizontal corners with said walls;
reinforcing webs secured to said sheets, including four ribs running along said corners, and at least one horizontal girdle surrounding a median section of said container; and
a load-distributing network of lengths of tensionresistant material including;
a first member running axially down the center of the container,
four suspending members, each extending down obliquely from an upper area of one of said vertical corners to the upper end of the first member, and
four shaping-members extending horizontally from the first member to contact the girdle in a median section of one of said walls.

5,073,036
HYDROSTATIC BEARING FOR AXIAL/RADIAL SUPPORT
Robert F. Sutton; Joseph K. Scharrer, both of Newbury Park, and Robert F. Beatty, West Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.
Filed Mar. 30, 1990, Ser. No. 501,576
Int. Cl.[5] F16C *32/06*
U.S. Cl. 384—107 **16 Claims**



1. A fluid axial and radial lubricated bearing for turbomachinery which comprises
a rotatable shaft,
a bearing member mounted for rotation on said shaft and having a projected area in both the axial and radial directions,
a fixed bearing support housing adjacent to and spaced from said bearing member and forming an annular space defining a region for a fluid film, such space forming a fluid flow path extending both radially and axially around said bearing member to form a hydrostatic film barrier which centers the shaft,
means for injecting a pressurized fluid into said annular space,
a plurality of non-rotating split rings positioned around said shaft, said rings located forward and aft of said bearing member and said bearing support housing,
means for radially spring loading said split rings to force said rings into seating contact with and to support and center the shaft during start-up and shut-down of said machinery, and
means forming annular passages between said rings and said shaft forward and aft of said annular space, said annular space communicating with said annular passages, whereby during steady state operation of said machinery, pressurized fluid in said annular passages forces the split rings out of contact with the shaft.

5,073,037
SPINDLE ASSEMBLY
Yoshio Fujikawa, and Shizuka Yamazaki, both of Iwata, Japan, assignors to NTN Corporation, Osaka, Japan
Filed Jul. 18, 1990, Ser. No. 553,840
Claims priority, application Japan, Jan. 20, 1989, 1-12875
Int. Cl.[5] F16C *32/06*
U.S. Cl. 384—120 **7 Claims**



1. A spindle assembly comprising:
a spindle;

at least one bearing sleeve means for supporting said spindle as an externally pressurized gas bearing without touching said spindle; and

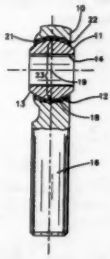
a housing means for accommodating said bearing sleeve means, said bearing sleeve means being formed with at least three axially-extending gas supply grooves communicating with a clearance formed between said spindle and said bearing sleeve means to feed compressed gas thereinto and an axially-extending exhaust groove communicating with said clearance to discharge said compressed gas therefrom, and said gas supply grooves being formed on an outer peripheral surface of said bearing sleeve means and longitudinally along a length thereof.

5,073,038

SWIVEL BEARING

Timothy B. O'Connell, Fort Wayne, Ind., assignor to Tuthill Corporation, New Haven, Ind.

Filed Jul. 12, 1990, Ser. No. 551,286
Int. Cl.[5] F16C *23/04*
U.S. Cl. 384—206 **11 Claims**



1. A ball and socket swivel bearing comprising a metallic socket member defining a socket having an inner surface and having at least one side opening, a metallic swivel ball member having an exterior spherical bearing surface positioned within said socket and providing an equator within said socket, said bearing surface being spaced from said surface of said socket and cooperating therewith to define a cavity, a bearing material molded in said cavity providing an interior spherical bearing surface mating with said exterior spherical bearing surface and an outer surface mating with the adjacent surface of said socket, said bearing material supporting said ball member during swiveling movement thereof relative to said socket member, said ball member being accessible through said side opening, said socket member providing retainer surfaces on both sides of said equator having a diameter less than the diameter of said equator of said ball member and spaced from said ball member during normal operation, said retainer surfaces preventing movement of said ball member out of said socket in the event said bearing material fails, said socket member providing a thinned laterally extending lip along one side thereof providing one of said retainer surfaces.

5,073,039

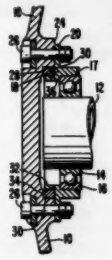
BEARING ASSEMBLY WITH THERMAL COMPENSATION

Roger M. Shervington, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 15, 1988, Ser. No. 271,274
Int. Cl.[5] F16C *35/077*
U.S. Cl. 384—278 **21 Claims**

1. Apparatus for critically positioning an internal structure made of a material having a low coefficient of thermal expansion by a housing wall made of a low density alloy having a coefficient of thermal expansion higher than that of the internal structure wherein an outwardly facing cylindrical surface of the internal structure is circumferentially engaged by an inwardly facing cylindrical surface comprising:

a support spigot having a central flange with means for attachment to the housing wall around a bolt circle, said support spigot further comprising two hubs on opposite sides of said central flange with a first hub having said inwardly facing cylindrical surface that engages the circumferential surface of said internal structure and a second hub having an outwardly facing cylindrical surface and an inwardly facing surface that is free of engagement with any other structure;



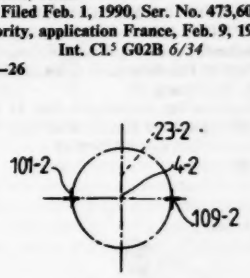
a liner having cylindrical inner and outer facing surfaces and made of a material having a coefficient of thermal expansion intermediate that of the internal structure and of said low density alloy, said liner being received on the outwardly facing cylindrical surface of said second hub and within an inwardly facing surface of said housing wall whereby radial displacement and circumferential retraction of said second hub occurs in response to contraction forces induced by said liner on said second hub.

5,073,040

MECHANO-OPTICAL DEVICE, IN PARTICULAR A ROTARY OPTICAL JOINT

Maurice Guinard, Saint-Cloud, France, assignor to Electronique Serge Dassault, France

Filed Feb. 1, 1990, Ser. No. 473,600
Claims priority, application France, Feb. 9, 1989, 89 01709
Int. Cl.[5] G02B *6/34*
U.S. Cl. 385—26 **47 Claims**



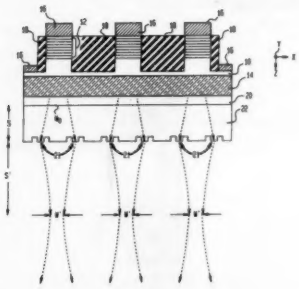
1. A mechano-optical device, comprising a support adapted to receive at least one substantially parallel incident beam of known axis of incidence, and an element having a reflecting concavity forming a substantially straight reflecting dihedron which is turned towards the incident beam to permit a double reflexion thereof, wherein said dihedron is rotatable relative to said support about an axis of rotation substantially comprised in a plane of bisection of said dihedron and substantially perpendicular to its edge, whereby said axis of incidence is a generatrix of a first surface of revolution about said axis of rotation and the beam thus reflected is a generatrix of a second surface of revolution about said axis of rotation, said first and second surface of revolution being two cones whose spices are symmetrical relative to the edge of the element forming said dihedron.

5,073,041

INTEGRATED ASSEMBLY COMPRISING VERTICAL CAVITY SURFACE-EMITTING LASER ARRAY WITH FRESNEL MICROLENSES

Kasra Rastani, Freehold, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Nov. 13, 1990, Ser. No. 612,924
Int. Cl.[5] H01S 3/125
U.S. Cl. 385—33 6 Claims



1. An integrated laser-lens assembly comprising an array of vertical cavity surface-emitting lasers, each of said lasers comprising an active region sandwiched between a first mirror individual to each of said lasers and a second mirror common to all of said lasers and individual electrical contacts for each of said regions,

a substrate having a high transmissivity at the wavelengths emitted by said lasers extending across said second mirror and integrally formed therewith, and

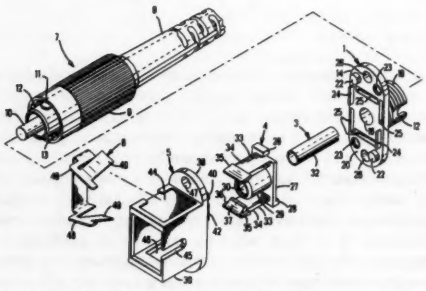
a plurality of planar Fresnel microlenses formed in the outer surface of said substrate, each of said microlenses being in alignment with the individual electrical contact of one of said vertical cavity surface-emitting lasers and comprising means defining concentric zones.

5,073,042

COUPLING BUSHING FOR VARIOUS TYPES OF OPTICAL FIBER CONNECTORS

Denis G. Mulholland, Lancaster; Ronald R. Schaffer, and Gary N. Warner, both of Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 541,675, Jun. 21, 1990, Pat. No. 5,042,891. This application Jul. 27, 1990, Ser. No. 558,932
Int. Cl.[5] G02B 6/36
U.S. Cl. 385—69 12 Claims



1. A coupling busing for an optical fiber connector, the connector including a central passageway, an alignment ferrule, and an optical fiber, the coupling busing comprising a half structure, said half structure comprising:

a base having a profiled axial bore;

a socket extending from a rear of the base and having a bore axially aligned with the bore of the base to form an extension thereof and adapted to receive an alignment ferrule of said optical fiber connector;

at a front face of the half structure, a pattern of ridges and slots forming a keying feature for intermating with a complementary feature of another connecting base;

at least one recess and at least one nub forming aligning and orienting features for intermating with complementary aligning and orientation features of the connecting base; and

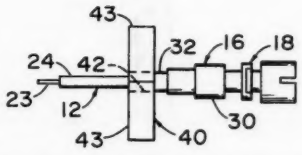
a barrel-shaped coupling body extending from a rear face at the rear of said base and encompassing the socket within an interior of the socket, said interior being adapted to receive an end of the optical fiber connector.

5,073,043

CABLE JACKET RESTRAINT IN OPTICAL FIBER CONNECTORS

Brain A. DiMarco, 620 Asheton Way, Simpsonville, S.C. 29681; Akira Kawahara, 3-34-12, Higashi-Korgakubo Kokubunji-shi, Tokyo, Japan, and Ryo Nagase, 2-6-1-204, Higashihara Mito-shi, Ibaraki-ken, Japan

Filed Sep. 6, 1990, Ser. No. 578,911
Int. Cl.[5] G02B 6/36, 7/26
U.S. Cl. 385—81 5 Claims



1. A method of assembling together a tubular member and an optical fiber having an outer protective jacket, the method comprising:

providing a tubular member having a wall portion provided with inwardly facing serrations,

inserting the fiber and the jacket into said tubular member,

reducing the cross section of said tubular member on said outer jacket such that the serrations engage and secure said jacket in said tubular member and in a manner that allows the optical fiber to move longitudinally within the jacket and tubular member.

5,073,044

RIGHT ANGLE STRAIN RELIEF FOR OPTICAL FIBER CONNECTOR

Walter A. Egner, Harrisburg, and Ronald A. Hileman, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 31, 1990, Ser. No. 606,254
Int. Cl.[5] G02B 6/26, 6/44
U.S. Cl. 385—86 2 Claims

1. An optical connector comprising;

an alignment ferrule having a central passage for aligning an optical fiber of an optical cable;

molded, flexible curved rubber boot having a cylindrical axial bore sized for receiving the optical fiber cable therewithin;

the alignment ferrule having a central passage for aligning an optical fiber, and having a radially enlarged collar and a circumferential groove spaced from a rear transverse face of the collar, and having a rear circumferential groove and a flange;

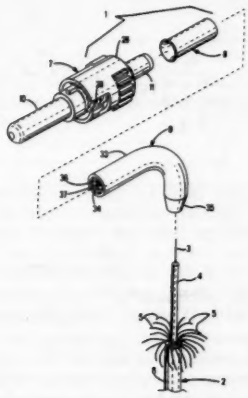
a snap ring mounted in the groove;

a coupling nut moveable axially over the ferrule and having

a transverse inner flange encircling the alignment ferrule forwardly of the snap ring;

a spring for compression directly in engagement against the rear transverse face of the collar and for compression against the inner flange;

a clearance between the coupling nut and the collar in which the collar is moveable during retraction of the collar into the coupling nut to compress the spring;



said boot having a cylindrical axial bore sized for receiving the optical fiber cable therewithin;

an annular flange and a recess within axial bore at a front end of said boot complementarily fitted to said rear circumferential groove and said flange of said ferrule;

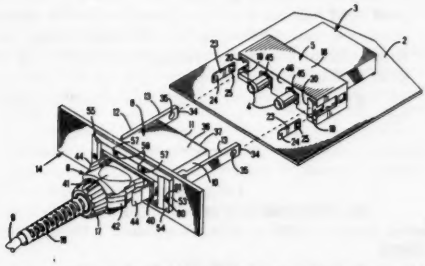
and said boot having a curvature along a curved line extending the cable 90 degrees to the plane of connection between said ferrule and said boot.

5,073,045

CONNECTOR WITH IMPROVED CLIP CONNECTOR HALF

Frederic H. Abendschein, Columbia, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 25, 1991, Ser. No. 675,610
Int. Cl.[5] G02B *6/36, 7/26*
U.S. Cl. 385—90 **7 Claims**



1. A connector for joining light transmitting fiber cables through a cover to a transmitter and/or receiver device comprising:

a plug connector half comprising; a plug having axial extending bore for receiving an optical fiber; and a transceiver adapter adapted to axially receive said plug through said cover, wherein said transceiver adapter is a two-part structure comprising; a transceiver shroud adapted to axially receive said plug and extending forward axially for alignment of said plug relative to said transmitter and/or receiver device; and, integral with said shroud, a latching beam mechanism having forward extending latching beams each having a port transverse through the longitudinal axis of said beam and located toward said forward end;

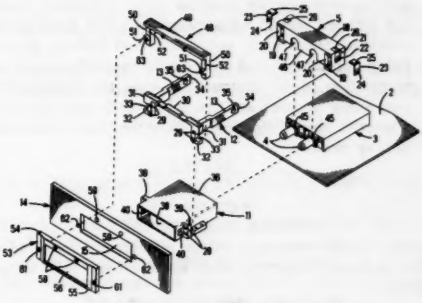
and clip connector half attached to and integral with said transmitter/receiver device and comprising a clip connector half having apertures each therein beveled to receive a respective latching beam, clip retention slots each coextensive to each aperture through a cut-out common to both the retention slot and the aperture, and a clip with a dimple, the clip adapted to slide within a respective retention slot with the dimple biased through the cut-out in the slot and into engagement with the latching beam through the port of the beam upon mating of the plug connector half to the clip connector half.

5,073,046

CONNECTOR WITH FLOATING ALIGNMENT FEATURE

Bryan T. Edwards, Camp Hill; Steven L. Flickinger, Hummelstown; James D. Kevern, Wellsville; David D. Sonner, Harrisburg; Robert N. Weber, Hummelstown, and Jeffrey A. Zeiders, Middletown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 667,724, Mar. 11, 1991. This application Apr. 17, 1991, Ser. No. 686,896
Int. Cl.[5] G02B *6/26*
U.S. Cl. 385—90 **12 Claims**



1. A connector for joining light transmitting fiber cables through a cover to a transmitter and/or receiver device characterized by a plug half connector comprising; a plug having axial extending bore for receiving an optical fiber; a transceiver adapter adapted to axially receive said plug through said cover and extending axially forward for aligning said plug relative to said transmitter and/or receiver device, and further comprising;

retention frame mounted to said cover and captivating said transceiver adapter with play of said adapter within said frame so as to permit free floating of said transceiver adapter relative to said cover within said retention frame.

5,073,047

OPTICAL SEMICONDUCTOR MODULE

Akinobu Suzuki; Yuji Sakazaki, and Takeshi Nakamura, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 29, 1990, Ser. No. 546,381
Claims priority, application Japan, Jul. 5, 1989, 1-173202
Int. Cl.[5] G02B *6/42*
U.S. Cl. 385—93 **9 Claims**

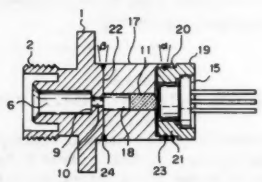
1. An optical semiconductor module which is connected to

an optical cable to introduce laser light from a semiconductor light-emitting device into said optical cable, comprising:

a holder which holds said semiconductor light-emitting device;

a housing which has a rod lens positioned therein and to which said holder is connected by fitting engagement that is made between one end of said housing and one end of said holder such that the optical axis of said semiconductor light-emitting device and the optical axis of said rod lens coincide with each other; and

a connecting member to which said optical cable is connected, said connecting member being connected to the other end of said housing adjustably within a plane which perpendicularly intersects the optical axis of said optical



cable and is defined at the abutment between facing walls of said respective housing and connecting member such that laser light from said semiconductor light-emitting device that passes through said rod lens enters said optical cable,

said holder, housing and connecting member being formed with substantially like diameter outer cylindrical walls; and first and second weld means, said first weld means providing retention of said holder and housing in said fitting engagement, said second weld means formed at the intersection of the abutment between the housing and connecting member and the substantially like diameter respective outer cylindrical walls of the housing and connecting member.

5,073,048

OPTICAL FIBER BUNDLE

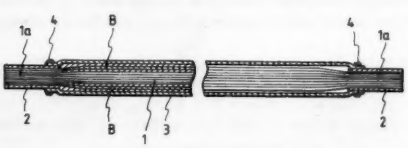
Rensuke Adachi; Shizuharu Miura, and Hiroshi Sano, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,665

Claims priority, application Japan, Jul. 6, 1987, 62-169386; Jul. 24, 1987, 62-185693; Jan. 28, 1988, 63-10189[U]

Int. Cl.[5] G02B *6/04*

U.S. Cl. 385—115 **21 Claims**



7. An optical fiber bundle for an endoscope comprising: a plurality of optical fibers bound at both ends, individual fibers being rendered freely movable; and a flexible tube of a polyurethane resin in a middle portion between the two ends of said optical fibers, thereby forming a bundle of optical fibers which can be slipped into an inserting portion of the endoscope, without a dual case structure, wherein said optical fibers in said flexible tube of polyurethane resin are coated with a liquid silicone that gels upon heating or standing at normal temperatures.

5,073,049

PRINT CONTROL FOR DOT MATRIX PRINTER

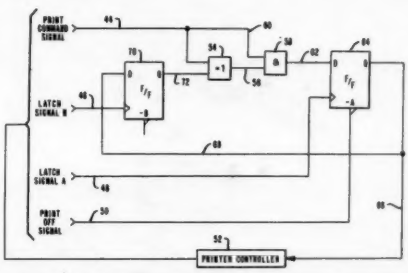
Kunjo Numata, Chigasaki; Noriyasu Niikura, and Takemi Kobayashi, both of Hiratsuka, all of Japan, assignors to NCR Corporation, Dayton, Ohio

Filed Jul. 24, 1989, Ser. No. 385,337

Claims priority, application Japan, Sep. 16, 1988, 63-230157

Int. Cl.[5] B41J *29/40*

U.S. Cl. 400—54 **6 Claims**



1. Print control mechanism for a dot matrix printer having a printer controller and a plurality of single element print heads wherein the speed of lateral movement of the print heads is faster than the printing cycle response time of the print heads to inhibit continuous printing by at least one of said print heads while enabling high speed in printing operations, said mechanism comprising:

memory means comprising a first flip-flop for storing the status of a printing operation by said at least one print head which printing operation has been performed immediately prior to a subsequent printing operation which is scheduled to be performed, and

printing inhibiting means including a second flip-flop coupled to said first flip-flop for comparing a print command signal from said printer controller with a memory signal from said first flip-flop, said second flip-flop outputting a high level signal for a predetermined period of time as set by a print off signal from said printer controller to said second flip-flop for a printing operation upon input of a first latch signal from said printer controller into said second flip-flop, and said second flip-flop outputting a low level signal upon input of a second latch signal into said first flip-flop and upon receipt of a low level signal from said first flip-flop by said second flip-flop to output to the printer controller a signal for inhibiting the subsequent printing operation by said one print head when said one print head receives a print command signal for another printing operation following the performed printing operation whereby continuous printing operation by said one print head is inhibited dependent upon the low level output signal of said second flip-flop to said printer controller.

5,073,050

ERGONOMIC KEYBOARD APPARATUS

Steffen Andrews, 6501 N. 17th Ave., Suite C., Phoenix, Ariz. 85015

Filed Jun. 12, 1990, Ser. No. 536,978

Int. Cl.[5] B41J *3/54*

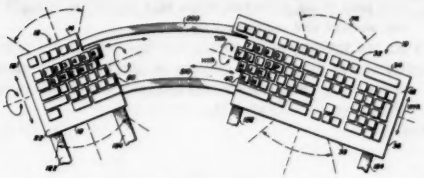
U.S. Cl. 400—82 **7 Claims**

1. Ergonomic keyboard apparatus comprising, in combination:

keyboard means, including a first keyboard portion and a second keyboard portion;

arcuately extending track means on which the first and second keyboard portions are movable to space the first

keyboard portion apart from the second keyboard portion and radially outwardly from a user; and



means for moving the keyboard means relative to the track means for positioning the keyboard portions as desired for the user's hands.

5,073,051

MATRIX PIN PRINT HEAD HAVING A SHIELD TO COUNTER MAGNETIC FIELDS

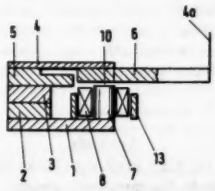
Bernd Gugel, Ulm-Einsingen, and Matthias Ullrich, Albeck, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Feb. 20, 1990, Ser. No. 481,166

Claims priority, application European Pat. Off., Feb. 20, 1989, 89730039.8

Int. Cl.[5] B41J *2/27*

U.S. Cl. 400—124 **28 Claims**



1. A matrix pin print head comprising

a base plate made of a soft-magnetic material;

an annular permanent magnet disposed on the base plate; a distance spacer ring made of a soft-magnetic material; a plurality of actuators, each of said actuators comprises a radially outwardly disposed pretensioned spring;

a soft magnetic material configuration;

an electromagnetic coil disposed on the base plate, wherein each electromagnetic coil is at least partially surrounded at its circumference with said soft-magnetic material configuration and is thereby shielded against a magnetic field of neighboring electromagnetic coils;

an armature body at a radially inwardly disposed point attached at the respective spring, which armature body is biased against the core of the electromagnetic coil disposed in each case on the base plate, wherein the magnet flux, generated by the annular permanent magnet, is to be balanced by feeding current into the electromagnetic coil, and wherein the armature body can be shot off against a recording material carrier;

a print element attached at the armature body.

5,073,052

REUSEABLE INK RIBBON CASSETTE ADJUSTABLE TO DIFFERENT RIBBON WIDTHS AND METHOD OF USE

Phillip B. Daley, Cincinnati, and Richard D. Puckett, Miamisburg, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 23, 1991, Ser. No. 659,769

Int. Cl.[5] B41J *35/28*

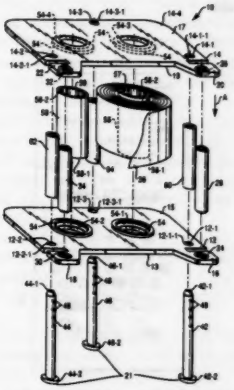
U.S. Cl. 400—208 **18 Claims**

1. A reuseable ink ribbon cassette which is capable of accommodating ink ribbons having different widths, said reuseable ink ribbon cassette comprising:

a first cover member;

a second cover member;

bearing means located on said first and second cover members for rotatably supporting a ribbon supply spool and a ribbon take-up spool between said first and second cover members when said first cover member is detachably secured to said second cover member; and



securing means for adjustably and detachably securing said first cover member and said second cover member a preselected distance away from each other; said preselected distance generally corresponding to the width of the ink ribbon;

said securing means enabling said preselected distance to be adjusted in order to accomodate ink ribbons having different widths.

5,073,053

COLOR DISCRIMINATION APPARATUS FOR COLOR INK RIBBON

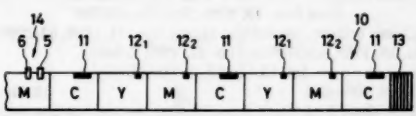
Shinichi Kashiwagi, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1990, Ser. No. 488,862

Claims priority, application Japan, Mar. 6, 1989, 1-53206

Int. Cl.[5] B41J *31/09*

U.S. Cl. 400—240.3 **9 Claims**



1. A color discrimination apparatus for a color ink ribbon which comprising:

a long and narrow color ink ribbon in which ink supply portions of respective colors are repeatedly formed with the same arrangement;

a ribbon carrying means which moves the color ink ribbon on its lengthwise direction;

discrimination marks which are parallel to the lengthwise direction of said color ink ribbon, wherein the length of each of said marks is indicative of a respective color of said ink supply portions, and said marks are positioned on the same straight line and formed at one edge of said color ink ribbon; and

a discrimination mark read-out means which is located at the position opposite the discrimination marks and provided

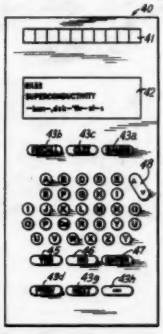
with two optical sensors arranged on a straight line in the direction along which said color ink ribbon moves.

5,073,054

ELECTRONIC DICTIONARY WITH VERTICAL KEYBOARD

W. Stuart McDowell, 235 W. 76th St. - Suite 12A, New York, N.Y. 10023

Filed Aug. 23, 1990, Ser. No. 572,006
Int. Cl.[5] B41J *5/10*
U.S. Cl. 400—486 **8 Claims**



1. An electronic device adapted to be typed upon using either hand and to be used as a bookmark, comprising;

(a) a housing having a front face of at least 2×3 inches and a thickness of ¼ inch or less;

(b) a keyboard having a plurality of rows of keys, each row having a left and right edge, the keys in each row being in substantial alphabetical order; wherein vowels correspond to the keys at each of said edges; the vowels at the left edge of each row are in alphabetical order and the vowels at the right edge of each row except the last row, are the same as the vowels at the left edge of the next row;

(c) a power source within the housing

(d) a microprocessor within the housing connected to said power source and keyboard and having a digital data memory.

5,073,055

SHEET-FEED/SHEET-RECEIVING UNIT USED IN COMBINATION WITH PRINTER

Kazuhiko Takagi, Nagoya, and Rikuo Sonoda, Aichi, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

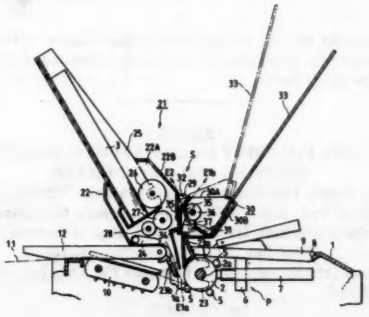
Filed Nov. 13, 1989, Ser. No. 434,289
Claims priority, application Japan, Nov. 11, 1988, 63-286547; Dec. 16, 1988, 63-318908; Feb. 13, 1989, 1-34632
Int. Cl.[5] B41J *13/00, 15/00*
U.S. Cl. 400—578 **39 Claims**

1. A sheet-feed/sheet receiving unit in combination with a printer having a print mechanism, the combination comprising a platen having an axis and being rotatable about its own axis for supporting a print sheet, and ink ribbon cassette accommodating an ink ribbon therein, and a print head movable along the platen for performing a print operation on the print sheet with the use of the ink ribbon, the printer being housed in a housing defined by a printer frame,

a hopper frame disposed above a first area of the printer frame and having a pair of connection arms connected to the platen to be rotatable about the axis of the platen, said hopper frame being adapted to receive a hopper storing a stack of cut sheets therein and having feedout means for feeding an uppermost cut sheet toward the platen;

a stacker disposed above a second area of the printer frame, said stacker being rotatably coupled to said hopper frame about an axis substantially parallel to the axis of the platen and being movable between a cut sheet receiving position allowing to receive the cut sheets discharged from the platen and a stacker rest position, a space above the second area being enlarged when said stacker is brought to the stacker rest position; and

a pin tractor disposed beneath the first area of the printer frame for mounting a continuous sheet, the continuous sheet being entrained by said pin tractor and fed toward the platen,



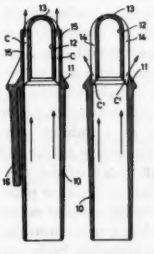
wherein said hooper frame is movably disposed between a cut sheet feeding position and a hopper rest position, the cut sheet feeding position capable of feeding the uppermost sheet of the stack of cut sheets toward the platen, and in the hopper rest position, a space above the first area of the printer frame being enlarged for mounting the continuous sheet.

5,073,056

MONOLYTHIC CAP FOR WRITING IMPLEMENTS

Domenico Belmondo, Borgaro, Italy, assignor to Dobell S.P.A., Turin, Italy

Filed Jan. 26, 1990, Ser. No. 470,824
Claims priority, application Italy, Apr. 28, 1989, 53048 B/89
Int. Cl.[5] B43K *5/00, 9/00*
U.S. Cl. 401—202 **4 Claims**



1. A cap for writing implements characterized in that it comprises a lower hollow body, joined at one end to a hollow upper body and having its top end closed and with a smaller diameter than the lower body; openings for fluid communication between the inside of the lower hollow body with the atmosphere being located in correspondence of a collar that joints said upper and lower hollow bodies; said openings being disposed alternately with tongues and sides extending upwardly from said collar and that are substantially parallel to the upper hollow body so as to define ducts between the sides and the outside of the upper hollow bodies; said ducts extending towards said closed end and terminating in a second set of openings for fluid communication between the lower hollow body with the atmosphere.

5,073,057
DISPENSING CONTAINER HAVING CAPILLARY PRESSURE COMPENSATING VALVE

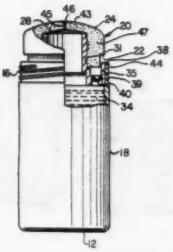
Stephen C. Lathrop, Butler; Keith Woodruff, Mountainside, and Edward Morris, Paramus, all of N.J., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 21, 1990, Ser. No. 590,449

The portion of the term of this patent subsequent to Nov. 6, 2001, has been disclaimed.

Int. Cl.[5] A45D *34/00*

U.S. Cl. 401—206 **7 Claims**



1. A liquid applicator suitable for use in the application of liquids to a surface, said liquid applicator comprising a container having a container body adapted for storing a quantity of liquid, said container having an opening at the upper end thereof, shaped applicator means positioned at said opening, said applicator means comprising a non-flexible, non-deformable, sintered, porous synthetic resin structure having a controlled porosity and having omni-directional interconnecting pores, spring means affixed to said opening, said spring means being adapted to normally urge said applicator means outward from said opening, and allow movement of said applicator means toward said opening when said applicator means is pressed against a surface, said applicator means being affixed to said spring means; an aperture through said applicator means adjacent to the central area thereof, said aperture being from about 0.005 to about 0.030 inches in diameter whereby said aperture retains the liquid in said container when the pressure inside and outside the container are substantially equal, but releases said liquid when there is a substantial pressure differential, thereby acting as a venting valve; said spring means providing an internal pressure in said container when said applicator means is pressed against a surface, whereby substantially equal pressures are maintained inside and outside of said container and substantially constant liquid flow can be maintained, on demand, through said applicator means.

5,073,058
IMPLEMENT FOR APPLYING LIQUID

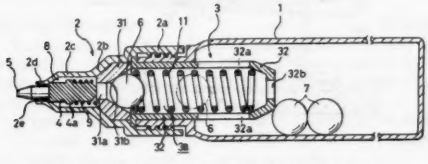
Mitsuhiro Fukuoka, and Nobuaki Kobayashi, both of Osaka, Japan, assignors to Kabushiki Kaisha Sakura Kurepasu, Osaka, Japan

Filed Apr. 16, 1990, Ser. No. 509,660

Claims priority, application Japan, May 17, 1989, 1-56854[U]; May 22, 1989, 1-129770

Int. Cl.[5] B43K *1/06, 5/00, 5/06, 5/18*

U.S. Cl. 401—260 **22 Claims**



1. An implement for applying a liquid comprising:

a container for holding liquid, said container having a front end which is open;

a front tube mounted on said front end of said container, said front tube having a forward outlet opening;

a hollow accommodating means having an interior chamber, said accommodating means having a rear opening means communicating said interior chamber with said container and a forward opening means communicating said interior chamber with said front tube;

a liquid feed member moveably disposed in said interior chamber between a closed position in which said liquid feed member engages said forward opening means to block off said communication between said interior chamber and said front tube and an open position in which said liquid feed member unblocks said forward opening means;

first biasing means biasing said feed member toward said closed position;

end valve means axially moveable in said front tube between a closed position in which said end valve means blocks said forward outlet opening and an open position in which said valve means unblocks said forward outlet opening;

second biasing means biasing said end valve means toward said closed position;

said front tube having an inner wall spaced from said end valve means to thereby define a clearance space between said inner wall and said end valve means, said clearance space defining a liquid retaining space for retaining said liquid;

an applicator means mounted on said end valve means and extending through said forward outlet opening, said applicator means having capillary properties;

said liquid feed member being movable from its closed position to its open position to pass liquid from said interior chamber of said accommodating member to said liquid retaining space, said applicator means being engageable with a writing surface to move said end valve means from said closed to said open position to pass liquid by the capillary action of said applicator means from said liquid retaining space through said outlet opening and onto said writing surface.

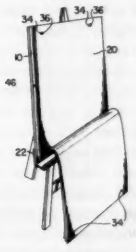
5,073,059
VISUAL DISPLAY SUPPORTING STRUCTURE

Joseph P. Josephson, 1300 Bloor St. E., Mississsauga, Ontario, Canada L4Y 3Z2

Filed Nov. 21, 1989, Ser. No. 439,803

Int. Cl.[5] B42F *13/00*

U.S. Cl. 402—80 R **16 Claims**



1. A display system for visual display purposes, comprising:

at least one display pad;

a supporting structure adapted for supporting said pad, said supporting structure having cooperating releasable retaining means at a top edge adapted to releasably hold said pad;

said pad having spaced opposed sides and comprising a plurality of sheets of material and means at one of said spaced opposed sides securing said sheets together;

first retaining means at said one of said spaced opposed sides

of said pad and second retaining means at the other of said spaced opposed sides of said pad;

perforation means adjacent said securing means;

said first and second retaining means adapted to cooperate with said releasable retaining means of said supporting structure for alternative support said pad with either of said spaced opposed sides at said top edge as desired;

wherein said sheets may be detached from said releasable retaining means and lowered when mounted with said one side at a lower part of said supporting structure, and wherein said sheets may be detached at said perforation means when mounted with said other side at said lower part.

5,073,060

PIVOT JOINT

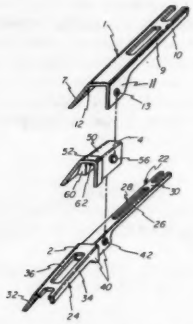
Peter C. Pethers, London, England, assignor to Trico Products Corporation, Buffalo, N.Y.

Filed Aug. 9, 1989, Ser. No. 391,749

Claims priority, application United Kingdom, Aug. 9, 1988, 8818861

Int. Cl.[5] B60S *1/38*

U.S. Cl. 403—405.1 **11 Claims**



1. A pivot joint comprising a first member of generally channel section having a base and opposed sides defining a channel at least in the region of the joint, a second member to which said first member is to be pivotally connected and which is adapted to lie at least partially within said first member in the region of the joint, and a joint body adapted to lie around said second member while being largely contained within said channel of said first member, one of said opposed side of said channel section of said first member extending at an obtuse angle to the base of said channel, the cross section of said channel being trapezoidal, said joint body being shaped exteriorly to complement the interior of said channel of said first member and being provided with a pair of external trunnions, means defining corresponding apertures in the opposite sides of said first member adapted to be aligned with said trunnions, and means for attaching said joint body to said second member, the materials of the pivot joint and the arrangement of the parts of the pivot joint being such that said one obtuse side of said channel of said first member being resiliently flexible sufficiently to allow said second member together with said joint body to be snapped into said channel of said first member, said trunnions of said joint body being thereby inserted into the apertures in the opposed sides of said first member to complete the joint.

5,073,061

INDUSTRIAL RESTRAINT EDGING SYSTEM FOR SEGMENTED PAVING UNITS

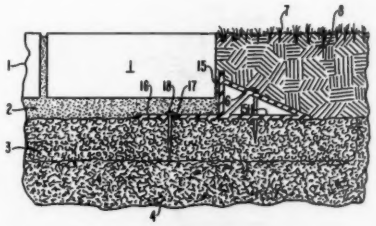
Stephen Jones, 10800 Morris Ave., South Bloomington, Minn. 55437

Filed Apr. 16, 1990, Ser. No. 509,173

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.[5] E01C *11/22*

U.S. Cl. 404—7 **86 Claims**



1. A segmented paving unit restraint system for edging and restraining segmented paving units on a base surface comprising:

a substantially vertical strip restraining member for defining a boundary around said segmented paving units, said substantially vertical strip restraining member being flexibly formed to accommodate for irregular shaped boundaries around segmented paving units and having a first side surface for facing segmented paving units and receiving substantially lateral forces therefrom, a second side surface for facing away from segmented paving units, and a top surface, said top surface being disposed below local ground level,

and a substantially horizontal segmented paving unit support member force lockingly connected to the vertical strip restraining member and extending horizontally inwardly from said first side surface to an inner end disposed under segmented paving units being restrained during use thereof, whereby the downward forces on segmented paving units is transferred to said segmented paving unit support member to clamp the same against an underlying base surface to restrain horizontal movements of the vertical strip restraining member resulting from the substantial lateral forces.

5,073,062

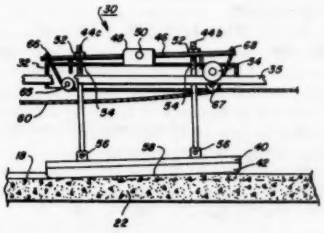
APPARATUS FOR TEXTURING BRIDGE DECKS, RUNWAYS AND THE LIKE

John Leone, 999 Aero Dr., Cheektowaga, N.Y. 14221

Filed May 31, 1988, Ser. No. 200,445

Int. Cl.[5] E01C *23/02*

U.S. Cl. 404—75 **3 Claims**



1. A method for forming transverse grooves in a concrete

bed such as a bridge deck or an airport runway comprising the steps of:

depositing concrete on the bed and thereby present a concrete mass in the plastic condition thereon,

impressing a plurality of parallel arranged cutter blades each having a tapered cutting edge into the surface of the plastic concrete,

tilting said cutter blades relative to the surface of the concrete sufficiently to position the leading edges of the blades above the surface and the trailing edges below the surface, and

moving said cutter blades with the tapered edges imbedded into the surface of the plastic concrete in a direction normal to the longitudinal axis of the concrete bed thereby producing a series of parallel tapered transverse grooves therein.

5,073,063

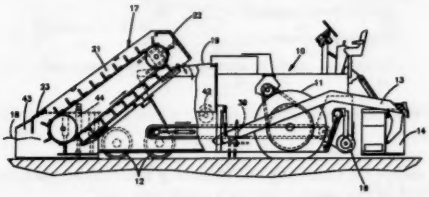
WINDROW PAVING MACHINE AND METHOD OF PAVING

Robert L. Brown, Mattoon, Ill., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Aug. 20, 1990, Ser. No. 569,997

Int. Cl.[5] E01C *19/12, 19/45*

U.S. Cl. 404—101 **18 Claims**



1. A paving machine for paving a roadway with paving material supplied in the form of an elongated windrow extending along said roadway, comprising a body assembly, means supporting said body assembly for movement along said roadway substantially in alignment with said windrow, leveler means on said body assembly operable to distribute and level said paving material, said machine providing powered means operable to separate an upper portion of said paving material from the lower portion thereof and to temporarily store said upper portion, said machine operating to move said leveler means along said lower portion to pave said roadway therewith, said power means operating to supply part of said upper portion when the volume of said lower portion is insufficient for the desired paving, said body assembly providing a tunnel having a top wall and opposed side walls through which said lower portion of said paving material passes to said leveler means.

5,073,064

METHOD AND APPARATUS FOR RETORQUING AN INSTALLED MINE ROOF BOLT

Henry A. Leonard, Birmingham, Ala., and Charles W. Schaffer, Lebanon, Pa., assignors to Birmingham Bolt Company, Birmingham, Ala.

Filed Apr. 27, 1990, Ser. No. 515,838

Int. Cl.[5] E21D *20/02*

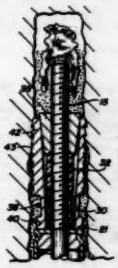
U.S. Cl. 405—259.6 **23 Claims**

1. An anchor assembly operably associated with a bore hole formed in a substrate for anchoring a tensioned bolt to the substrate, the tensioned bolt having a threaded portion at one end thereof, comprising:

a) mechanical expansion means for mechanically anchoring a tensioned bolt to a substrate, said mechanical expansion means having upper and lower surfaces;

b) bonding surface, operably associated with said mechanical expansion means, for being bonded to a substrate by a resin bonding means; and,

c) anti-bonding means, operably associated with said mechanical expansion means, for preventing the resin bonding means from bonding at least a portion of the tensioned



bolt to the substrate and thereby permitting relative rotation between the bolt and said mechanical expansion means, said anti-bonding means having a first flexible member, at least a portion of said first flexible member extends between said upper and lower surfaces of said mechanical expansion means.

5,073,065

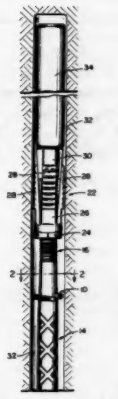
MINE ROOF BOLT WITH RESIN RETENTION AND RESIN MIXING DEVICE

Charles W. Kleineke, Rayland, Ohio, assignor to Advanced Mining Systems, Inc., Steubenville, Ohio

Filed Dec. 6, 1990, Ser. No. 623,071

Int. Cl.[5] E21D *20/02*

U.S. Cl. 405—259.6 **6 Claims**



1. A mine roof support assembly comprising:

a mine roof bolt having a main body portion of a predetermined diameter, a terminal portion having a diameter less than said main body portion and a tapered shoulder portion extending between said terminal portion and said main body portion, said terminal portion being threaded,

a resin mixing and resin retention device located on said tapered shoulder portion and having an annular configuration with an inner diameter greater than the diameter of said terminal portion and less than the diameter of said main body portion, and

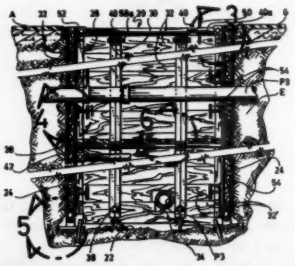
lock means mounted on said terminal portion for engaging a sidewall of a mine roof bore upon rotation of said bolt so as to mechanically lock said bolt in the bore.

5,073,066

WALL RETAINING AND SCAFFOLDING ASSEMBLY FOR GROUND EXCAVATION AND METHOD FOR DISMANTLING SAME

Pierre Richland, 720, Montée des Bouleaux, L'Acadie, Québec, Canada J0J 1H0

Filed Aug. 21, 1990, Ser. No. 570,317
Int. Cl.[5] E02D *3/02*
U.S. Cl. 405—279 9 Claims



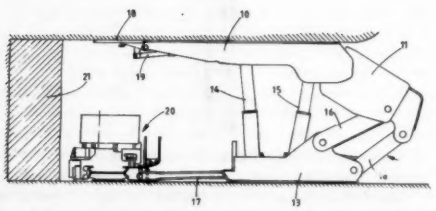
7. A post section for excavation sheeting in the form of an I-beam defining a web and an inner and an outer flange forming a pair of oppositely-directed sheet-receiving channels, said outer flange adapted to be positioned against an excavation face, means for interconnecting post sections in end-to-end relation, including a flat tongue secured to the web of said post section and protruding from one end of said post section, and a block fixed to said inner flange and protruding from the other end of said post section, said tongue and said web having pin-receiving bores, which register when said one end of said post section is joined to said other end of an adjacent post section; whereby, when pin means are releasably inserted through said registering bores, said tongue and block maintain the inner and outer flanges of two joined post sections in respective 7.

5,073,067

MINE ROOF SUPPORT

Peter Elliott-Moore, Evesham, England, assignor to Meco Mining Equipment Limited, Ashchurch, England

Filed Apr. 4, 1991, Ser. No. 680,422
Claims priority, application United Kingdom, May 2, 1990, 9009859
Int. Cl.[5] E21D *15/44*
U.S. Cl. 405—302 8 Claims



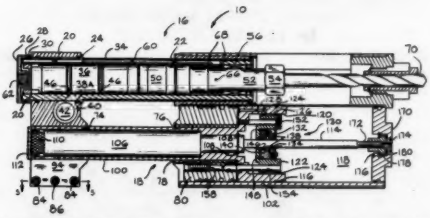
1. A mine roof support comprising a roof engageable canopy, a floor engaging base section, prop means for raising and lowering the canopy relative to the base section and for setting the canopy against a mine roof, a check valve (as defined herein), means for supplying hydraulic fluid under pressure to the prop means via the check valve, and a yield valve having a valve seat, a valve member movable between a first position in which it co-operates with the valve seat to prevent the release of fluid from the prop means via the yield valve and a second position in which fluid can be released from the prop means via the yield valve, means for subjecting one side of the valve member to fluid pressure downstream of the check valve to urge the valve member towards its second position, spring means acting on the other side of the valve member to urge the valve member towards its first position, and means for subjecting the other side of the valve member and the spring means to fluid pressure upstream of the check valve so that an increasing amount of the spring force applied to the valve member by the spring means is substituted by hydraulic force applied to the other side of the valve member by fluid pressure upstream of the check valve as the latter increases.

5,073,068

PECK FEED DRILLING MACHINE

Danny R. Jinkins, and Douglas D. Doeden, both of Hicksville, Ohio, assignors to Doler Inc., Hicksville, Ohio

Continuation of Ser. No. 528,153, May 24, 1990, abandoned.
This application Oct. 24, 1990, Ser. No. 605,141
Int. Cl.[5] B23B *47/22, 47/34*
U.S. Cl. 408—17 40 Claims



1. A peck feed drilling apparatus comprising, in combination,

means for rotating a drill bit,

means for advancing and retracting said drill bit, including

a feed rate control having a translating rod,

a feed piston disposed for translation within a chamber and defining a peck cylinder,

a peck piston disposed for translation within said peck cylinder,

a clutch operably disposed between said translating rod and said peck piston, and

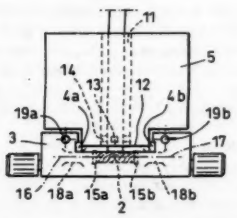
control means for cycling said advancing and retracting means.

5,073,069

MACHINE FOR MILLING THE ENDS OF INGOTS OR SLABS

Henri Line, Peymeinade, France, assignor to Helis, Peymeinade, France

Filed Dec. 31, 1990, Ser. No. 636,495
Int. Cl.[5] B23C *3/24*
U.S. Cl. 409—197 10 Claims



1. In a machine for milling the ends of oblong workpieces, particularly ingots or slabs, of the type comprising:

a fixed standard,

a broach head mounted to slide on two parallel guiding

slideways with which said fixed standard is provided, and able to be equipped with a cylindrical mill, and

means for driving the mill and the broach head, the fixed standard comprises a transverse conduit opening out on that face of said standard adjacent the broach head through an opening disposed between the two guiding slideways, said conduit being dimensioned to house part of the piece to be machined, the end to be milled emerging through said opening; the mill is disposed in front of said opening and perpendicularly to said slideways; and

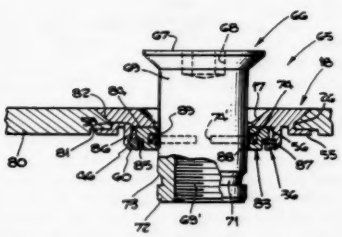
said standard is equipped with means for fixing the workpiece, placed as close as possible to the slideways.

5,073,070

PANEL FASTENER WITH FLOATING GROMMET ASSEMBLY

Peter Chang, North Hollywood, Calif., assignor to Avibank Mfg., Inc., Burbank, Calif.

Filed Sep. 13, 1990, Ser. No. 582,432
Int. Cl.[5] F16B *21/18*
U.S. Cl. 411—353 **10 Claims**



1. In a panel fastener assembly comprising a bolt having an enlarged head at one end, a tapered nose at the other end and an intermediate body portion, a groove provided on the bolt between the nose and the body portion, a grommet assembly encircling the bolt between said head and nose, said grommet assembly having an annular retaining ring mounted therein, the improvement which comprises:

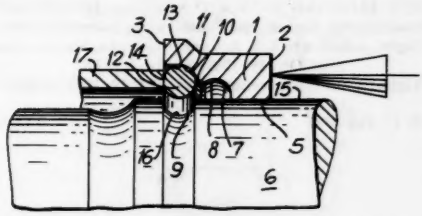
said grommet assembly including a grommet member having an annular cavity therein, and said grommet assembly including a spacer member disposed in said grommet member cavity, said spacer member also having an annular cavity therein surrounding said bolt, said annular retaining ring surrounding said bolt being mounted in said spacer member annular cavity, said ring thereby encircling said bolt between the head and nose thereof and being adapted to ride along the body portion of said bolt and snap into said groove, said spacer member being laterally movable with respect to said grommet member, said grommet member being swaged against said spacer member.

5,073,071

SHAFT STOP BUSHING

Wolfgang Herwig, Uslar; Dittmar Kleemann, Friedland; Uwe Kröger, Göttingen; Hans Würth, Ludwigsburg; Martin Mayer, Sersheim; Franz-Josef Meyer, Hildesheim; Werner Rometsch, Gerlingen; Erhard Schenkemeyer, Göttingen; Martin Schneider, Korntal; Jürgen Söllick, Göttingen; Lore Kochendörfer, Kernen-Rommelshausen, and Claus Kochendörfer, Kernen-Rommelshausen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE88/00542, § 371 Date Mar. 9, 1990, § 102(e) Date Mar. 9, 1990, PCT Pub. No. WO89/02540, PCT Pub. Date Mar. 23, 1989
PCT Filed Sep. 2, 1988, Ser. No. 490,681
Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730200
Int. Cl.[5] F16B *21/18*
U.S. Cl. 411—353 **3 Claims**



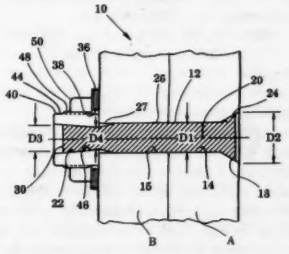
1. A shaft stop bushing assembly, comprising a shaft having an outer surface and an annular groove formed on said outer surface; a slit stop ring located in said annular groove of said shaft; and a bushing having a first end stop surface and a second end surface located opposite to one another and also a longitudinal bore extending between said opposite first and second surfaces, said longitudinal bore including a first circular groove for receiving said slit stop ring to secure said bushing on said shaft and having a portion tapering towards said second end surface and a first diameter, a cylindrical section extending between said first end stop surface and said first circular groove, and a second circular groove extending adjacent to said second end surface and having a second diameter larger than said first diameter for receiving said slit stop ring during mounting of said bushing on said shaft.

5,073,072

THREADED SPLIT-BUSHING FASTENER ASSEMBLY

Ebrahim Parekh; Jack E. Jensen, both of San Diego, Calif., and Jeffrey L. Summers, Littleton, Colo., assignors to General Dynamics Corporation/Convair Division, San Diego, Calif.

Filed Feb. 4, 1991, Ser. No. 650,116
Int. Cl.[5] F16B *19/00, 35/02*
U.S. Cl. 411—354 **5 Claims**



1. A threaded split-bushing fastener assembly comprising:

an elongated pin having a predetermined length, said pin having a front end and a rear end;

in sequence from its front end to its rear end, said pin has a head portion, a shank portion, and a rear end portion;

said shank portion having an outer diameter D1, said head portion having a diameter D2 that is greater than D1;

said rear end portion having an outer diameter D3 that is no greater than D1 and it tapers axially forwardly from its rear end first to a diameter D4 that is less than D1 by a predetermined amount and then to a diameter D1;

a tubular split-bushing having a front end, a rear end, and inner annular surface and an outer annular surface, said bushing being split longitudinally into at least two pieces, said tubular split-bushing being removably engageable around the tapered outer surface of the rear portion of said pin; and

means for preloading of the fastener assembly.

5,073,073

SELF-ALIGNING BOLT AND A SELF-ALIGNING NUT

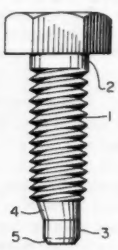
Hiroshi Kazino, Komaki, and Takahiko Ito, Ichinomiya, both of Japan, assignors to K.K. Aoyama Seisakusho, Nagoya, Japan

Filed Oct. 19, 1989, Ser. No. 423,882

Claims priority, application Japan, Oct. 19, 1988, 63-263572

Int. Cl.[5] F16B *25/00, 37/16*

U.S. Cl. 411—386 **3 Claims**



1. A self-aligning bolt, comprising:

an externally threaded shank having a central axis and a root diameter; and

a threadless eccentric pilot tip connected to the shank, said tip having a central axis offset from the axis of the shank, having a first threadless section of constant diameter less than the root diameter of the shank, having a periphery defined by said diameter disposed internally tangent to a circle defined by said root diameter, having a second threadless section which is tapered and extends between said shank and first section, and further having a chamfer on an end displaced from said threaded shank.

5,073,074

SET SCREW

Niall Corrigan, Hudson, Ohio; Gerry Keating, County Clare, and Desmond Beegan, Limerick, both of Ireland, assignors to SPS Technologies, Inc., Newtown, Pa.

Filed Jul. 26, 1990, Ser. No. 558,981

Int. Cl.[5] F16B *35/00*

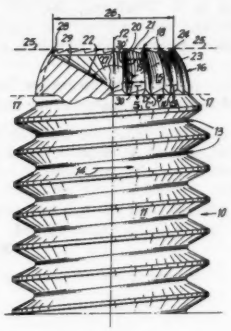
U.S. Cl. 411—393 **20 Claims**

1. A set screw comprising:

a shank having external threads;

a work-engaging end portion integrally formed at one end of the shank, said work-engaging end portion having a frustohemispherical outer surface comprising a plurality of circumferentially spaced serrations in the form of teeth, said serrations being radially disposed on the other surface in relation to the shank's longitudinal axis, each of said teeth comprising a ramp extending outwardly from a root to a crest thereof, said ramp being inclined in a direction which is opposite to the direction of rotation of engaging the set screw in a workpiece,

said outer surface having the same longitudinal axis as said shank and a larger diameter equal to the diameter of, and coterminous with, said shank having external threads, and



a cavity formed in the outer extremity of the work-engaging end portion, said cavity cooperating with the frustohemispherical outer surface to form therebetween an annular wedge.

5,073,075

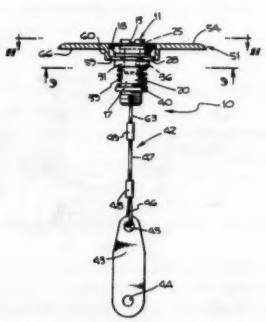
PANEL HOLE CLOSURE ASSEMBLY

John A. Duran, Glendora, Calif., assignor to Avibank Mfg., Inc., Burbank, Calif.

Filed Jan. 8, 1991, Ser. No. 638,689

Int. Cl.[5] F16B *21/00*

U.S. Cl. 411—552 **28 Claims**



1. An assembly for closing off an irregularly configured hole in a panel comprising:

a housing having an enlarged head with a countersunk opening therein at one end adapted to fit in an opening in said panel leading into said hole, said housing having an elongated shaft at the other end terminating in a nose portion, and a throughbore extending from said countersunk opening in said head at least partway through said housing along generally the longitudinal axis thereof;

a plunger having an enlarged head conforming to said countersunk opening at one end and an elongated shaft at the other end extending into said throughbore, said enlarged head of said plunger having a slot therein for receiving a tool therein for rotating the same;

a plate having an outer periphery conforming to said irregularly configured hole in said panel mounted on the outside of said shaft of said housing between the head of said housing and the nose portion thereof;

biasing means on the outside of said shaft of said housing between said plate and said nose portion normally biasing said plate toward said head of said housing; and

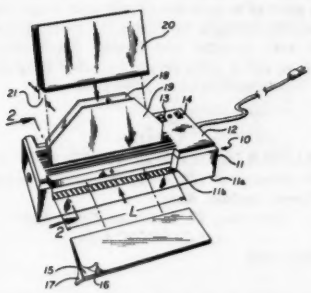
indexing means locking said plate to the shaft of said plunger permitting movement of said plate in a direction toward the nose portion of said housing when said plunger is moved downwardly against the bias of said biasing means yet permitting rotation of said plate about the longitudinal axis of said housing when said plunger is rotated in a direction about its longitudinal axis.

5,073,076

COMBINED LAMINATING AND BINDING MACHINE

Alan J. Parkhill, and Roy P. Cook, both of Temecula, Calif., assignors to Banner American Products, Inc., Temecula, Calif.

Filed Dec. 3, 1990, Ser. No. 620,733
Int. Cl.[5] B42B 5/00
U.S. Cl. 412—33 12 Claims



1. A combination pouch laminating and thermal binding machine comprising:

upper and lower elongated planar members of heat conducting material, said members each having an embedded electric heating coil, said members being generally parallel, horizontal and spaced vertically to provide a uniform gap therebetween;

feed means including at least one pair of counter-relating rollers for feeding a document sandwiched between two thermoplastic sheets into said gap and therethrough to effect lamination of said document when said,.embedded heating coils are energized to a temperature high enough to fuse said thermoplastic sheets;

a heat sink member of heat conductive material and of generally trapezoidal cross-section, said heat sink member having a lower surface in thermal contact with the upper surface of said upper planar member and having an upper surface making a first acute angle with respect to the upper surface of said planar member; and

guide means for holding a sheaf of papers to be bound along a common edge, said guide means being oriented such that said common edge of said sheaf of papers lies against said heat sink member upper surface.

5,073,077

MULTI-DIRECTIONAL LIFTING AND HANDLING ATTACHMENT FOR A BOOM-TYPE VEHICLE

Carl P. Altman, 1096 Oak Knoll Dr., Pomona, Calif. 91768

Filed Jun. 6, 1989, Ser. No. 361,957
Int. Cl.[5] B65G 47/00
U.S. Cl. 414—11 20 Claims

1. An attachment to the boom of a boom-type vehicle for lifting and supporting a panel assembly of the type having a panel and a purline, said purline being attached to said panel and disposed at an angle thereto, comprising:

(a) a mast assembly connectable to a forward end of the boom of said vehicle, including:

(i) means for providing selective vertical translation of a forward portion of said mast assembly relative to said boom in a vertical direction;

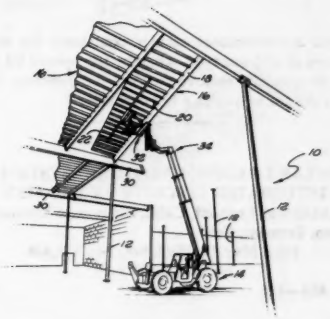
(ii) means for providing selective rotation of said forward portion of said mast assembly relative to said boom about a vertical axis; and

(iii) means for providing selective horizontal translation of said forward portion of said mast assembly relative to said boom along a first horizontal direction substantially parallel to the longitudinal axis of a purline supported thereby; and

(b) a panel handler assembly connectable to said forward portion of said mast assembly said panel handler assembly including:

(i) a rearwardly disposed purline supporting portion including;

(A) a rigid purline backrest assembly securely connectable to said forward portion of said mast assembly so as to extend in a vertical plane;



(B) a rigid base frame assembly integrally connected to a lower end of said backrest assembly so as to extend forwardly of said purline backrest assembly on a horizontal plane;

(ii) a forwardly disposed panel supporting portion rotatably attached to said purline supporting portion, said panel supporting portion including a rigid C-frame assembly circumscribable about a forward section of said purline supporting portion and hingedly attached to said purline supporting portion at two locations on said first horizontal axis; and,

(iii) means for providing selective rotation of said panel supporting portion relative to said purline supporting portion along a first horizontal axis substantially aligned in said first horizontal direction.

5,073,078

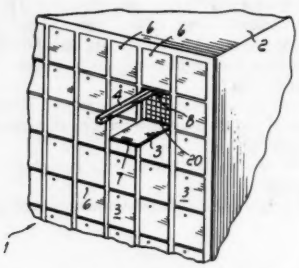
AUTOMATIC INTELLIGENT MAGAZINE FOR ELECTRONIC COMPONENTS

Vincenzo Merlo, Via Bellini 28, 22020 Lainate, Italy

Filed May 1, 1990, Ser. No. 517,253
Claims priority, application Italy, May 4, 1989, 20372 A/89
Int. Cl.[5] B65G 1/00
U.S. Cl. 414—274 8 Claims

1. An automatic modular magazine having means for feeding tubular containers containing respective stacks of electronic components to a delivery rack of a machine for the automatic insertion of integrated circuits, comprising a plurality of containment cells for tubular containers, said lid being pivotally mounted on an end portion of the magazine that is opposed to the rack end portion, each of said cells being defined by an elongated compartment which is closed at least at one end by an oscillable lid element, a plurality of sensor elements, each sensor element being associable at a respective preset position of said rack to indicate depletion of the electronic components of a particular type in at least one of said containers in said

rack, and electronic control circuit means driven by said sensor elements to indicate the depletion of said electronic components in said at least one container and actuate via opening means an opening oscillation of the oscillable lid element in a



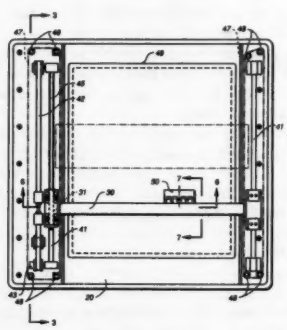
cell which accommodates tubular containers for electronic components of said one type, whereby the opened lid alerts an operator to manually remove the depleted container from the cell and refill the cell with a full container.

5,073,079

MODULAR LOADING-UNLOADING SYSTEM FOR INTEGRATED CIRCUITS OR THE LIKE

Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.

Filed May 17, 1990, Ser. No. 525,338
Int. Cl.[5] B25J *9/02*
U.S. Cl. 414—416 **8 Claims**



7. A system for automatically loading and unloading items into and from containers of different types having various configurations, said system comprising a plurality of unis, each of said units comprising

a unistructurally cast planar top plate,

a controlling module and a stand module both attached to said top plate from below and distal from each other so as to together support said top plate horizontally,

an elongated arm assembly which extends horizontally in a transverse direction above said top plate,

a holder member which is mounted to said arm assembly and slidable in said transverse direction therealong, and

a driver assembly for causing said elongated arm to move in a forward-backward direction perpendicular to said transverse direction and said holder member to move along said arm assembly, said driver assembly including

longitudinal rials which are fastened to said top plate and extend in said forward-backward direction, said arm assembly having an end structure which slidably engages with one of said longitudinal rails,

an elongated spline shaft extending in said forward-backward direction and rotatably supported by said top plate,

a first motor affixed to aid top plate,

a first power-communicating means for communicating the power of said fist motor to said end structure to thereby cause said arm assembly to move slidingly in said forward-backward direction along said longitudinal rails,

a second motor affixed to said top plate for causing said spline shaft to rotate, and

a second power-communicating means mounted to said arm assembly for communicating the rotary motion of said spline shaft to said holder member to thereby cause said holder member to slidingly move in said transverse direction a long said arm assembly,

said controlling module containing control means for controlling the operation of said first motor and said second motor according o a user-specified program, at lest one of said units further comprising a vacuum pick-up module for lifting up items, said vacuum pick-up module having vacuum generating means and tubular members with downwardly facing openings, said vacuum pick-up module being detachably attached to said holder member,

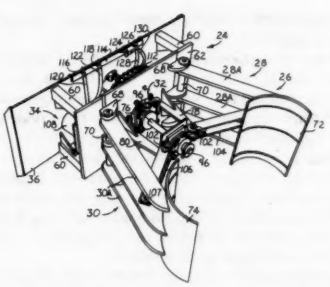
said top plate of at least one of said units being formed with an opening, having a removable top cover plate which can cover said opening and having detachably attached thereto an elevator for vertically transporting items to and from he top surface of said top plate.

5,073,080

GRAPPLE DEVICE FOR AUGER SECTIONS

Kenneth J. Blum, Parkville, Mo., assignor to Berkel & Company, Bonner Springs, Kans.

Filed Aug. 27, 1990, Ser. No. 572,561
Int. Cl.[5] B66C *3/16*
U.S. Cl. 414—739 **4 Claims**



1. Apparatus for handling elongated articles, comprising:

a stationary frame presenting a rear plate, an apertured front plate in spaced, opposed relationship to the rear plate, and structure on said rear plate for releasably coupling the article handling apparatus to a mobile vehicle;

a rotatable, apertured plate located in close adjacency with the face of said front plate remote from said rear plate, with the aperture of the rotatable plate being in registry with the aperture of the front plate;

a pair of spaced apart arms each having an article-gripping member adjacent the outer end thereof;

means mounting the inner ends of said arms to said rotatable plate for pivotal movement thereof about respective pivot axes;

means for selectively pivoting said arms, including—

a piston and cylinder assembly comprising an elongated cylinder presenting a rearward end and a forward end, and a reciprocal piston rod extending out of the forward end of the cylinder,

means mounting said cylinder within said frame with the rearward cylinder end operatively secured to said frame rear plate, and with the cylinder extending forwardly and at least partially through the registered apertures of the front and rotatable plates, said rod extending out-

wardly beyond said front and rotatable plates and towards said arms,

linkage means operably coupling said rod with said arms for pivotal movement of the arms in response to reciprocation of the rod; and

means operably connected with said rotatable plate for the selective rotational movement of the rotatable plate and said arms about an axis essentially coincident with the longitudinal axis of said rod and transverse to the pivot axis of said arms.

5,073,081

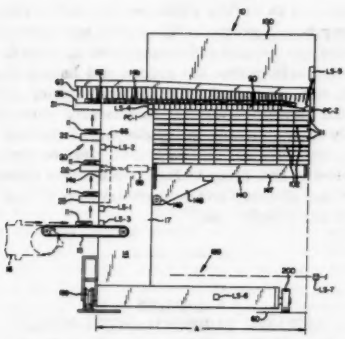
AUTOMATIC SELF-CONTAINED STACKING MACHINE

Nolton C. Johnson, 1221 NE. 6th St., Bend, Oreg. 97701

Filed Aug. 14, 1989, Ser. No. 394,108

Int. Cl.[5] B65G *57/18*

U.S. Cl. 414—786 **11 Claims**



1. A method for producing a stack of elongate, stackable workpiece at a receiving location comprising:

providing a plurality of readily movable, self-contained stacking modules;

temporarily positioning said stacking modules for cooperatively receiving a plurality of elongated workpieces, and for cooperatively producing a stack of said workpieces;

said temporary positioning step further including positioning said stacking modules relative to each other such that the distance between their respective outer edges in less than the length of said elongated workpieces;

providing a control system for interconnecting activating, and controlling said stacking modules for providing cooperative operation of said modules to receive and produce a stack of said workpieces;

controllably interconnecting said stacking modules with said control system thereby forming a stacking machine;

activating said stacking machine thereby initiating the stack formation operation;

receiving said elongate, stackable workpieces from an infeed direction;

conveying said elongate, stackable workpieces to an elevated point above ground level;

providing a location for the formation of a stackable layer of said infed workpieces;

infeeding said workpieces from said elevated point to said stackable layer formation location;

forming a stackable layer of said infed workpieces at said stackable layer formation location;

depositing said formed stackable layer at said workpiece receiving location;

accumulating a plurality of said deposits of said formed stackable layers one atop the other at said workpiece receiving location thereby producing said stack of elongate, stackable workpieces,

said stackable layer formation and deposition steps and said stack accumulation step, respectively, being conducted substantially within a lateral area extending from the elevated point for infeeding said workpieces to an outer longitudinal edge of the stackable layer formation location;

deactivating said stacking machine; and

disconnecting said interconnecting control system from said stacking modules thereby disassembling said stacking machine.

5,073,082

HYDRAULIC SCREW PUMP

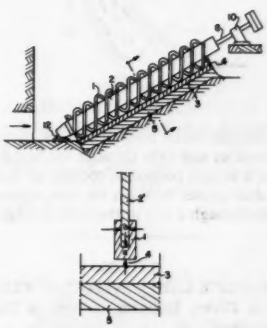
Karl-August Radlik, Dahlienweg 4, 7070 Schwabisch Gmund, Fed. Rep. of Germany

Filed Apr. 16, 1990, Ser. No. 509,297

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1989, 3913148

Int. Cl.[5] F01D *5/00*

U.S. Cl. 415—72 **9 Claims**



1. A hydraulic screw pump for feeding waste water comprising:

a screw body;

a rotary screw helically attached to the screw body;

a trough, the screw body being positioned in relation to the trough to form a gap of fixed width between an outer periphery of the rotary screw and the trough; and

a sealing element attached to the outer periphery of the rotary screw along its entire length, the dimensions of the sealing element being such as to maintain the gap width constant.

5,073,083

TURBINE VANE WITH INTERNAL COOLING CIRCUIT

Benoît P. Guyon, Combs La Ville, France, assignor to Societe Nationale d'Etude de Construction de Moteurs d'Aviation, Paris, France

Filed Mar. 6, 1991, Ser. No. 665,244

Claims priority, application France, Mar. 14, 1990, 90 03236

Int. Cl.[5] F01D *5/00*

U.S. Cl. 415—115 **8 Claims**

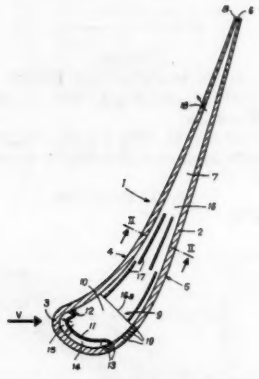
1. A vane for a turbomachine having an airfoil shaped body with a leading edge, a trailing edge, a generally concave sidewall, and a generally convex sidewall defining a hollow interior comprising:

a) a partition extending between the generally concave sidewall and the generally convex sidewall adjacent to, but spaced from the leading edge so as to define a turbulence chamber the partition defining air cooling orifices;

b) first evacuation orifices defined by the generally convex sidewall and communicating with the turbulence chamber; and,

c) a plurality of spaced apart heat exchange members extending substantially parallel to each other between the generally concave sidewall and the generally convex sidewall, the heat exchange members having a downstream edges

located adjacent to the trailing edge and upstream edges, the upstream edges, along with the partition and portions of the generally concave sidewall and the generally convex sidewall defining a cooling air supply duct whereby a first portion of cooling air in the cooling air supply duct



passes through the air cooling orifices, through the turbulence chamber and exits through the first evacuation orifices and a second portion of cooling air in the cooling air supply duct passes between the heat exchange members and exits through a slot at the trailing edge.

5,073,084

SINGLE-PRICE LABYRINTH SEAL STRUCTURE

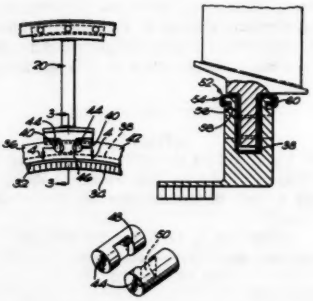
Roy T. Hirst, Derby, England, assignor to Rolls-Royce plc, London, England

Filed Sep. 17, 1990, Ser. No. 583,081

Claims priority, application United Kingdom, Oct. 4, 1989, 8922339

Int. Cl.[5] F01D *9/00*

U.S. Cl. 415—209.3 **5 Claims**



1. A labyrinth seal for a gas turbine engine of the type having an airstream flow therethrough, said engine having a radial pattern of stator vanes therein, each said stator vane having proximal and distal ends, said labyrinth seal comprising an annular land having an abradable lining and a radially outwardly turned annular flange which has an annular groove formed in its periphery, said annular groove having walls, said outwardly turned annular flange further having an upstream face and a downstream face with respect tot he airstream within said gas turbine engine, with each said face having a groove formed therein, a number of angularly spaced pairs of pins with ends, where said pins span the annular groove, each pin being fixed by its ends in said walls of said annular groove and wherein the pins of each said pair of pins are spaced, one from the other, by a distance which enables the insertion therebetween of an inwardly directed feature on the proximal ends of a plurality of stator vanes, where each said inwardly directed feature is retained by a particular pair of pins, said labyrinth seal further including a liner comprising a generally "U" section shaped segment made from anit-frettage material, said liner having free edge portions which are turned outwardly, downwardly, inwardly, and upwardly so as to enable spring clipping of said liner in a retaining manner in said annular groove, each said free edge of said liner being disposed in said groove provided in said respective upstream and said downstream faces of said annular flange, said liner segment being proportioned so as to fit closely against the walls within said annular groove, said liner having holes therein for the passage of said pins therethrough.

5. A liner for lining an annular groove having walls, said groove being formed in radially outwardly turned flanges on a labyrinth seal structure for a gas turbine engine, said outwardly turned flanges having an upstream face and a downstream face with respect to an air flow within said gas turbine engine, said liner comprising a generally "U" section segment made from an anti-frettage material and proportioned so as to fit closely against the walls within the groove and having means for retaining said segment therein, said liner having free edges which are turned outwardly, downwardly, inwardly, and upwardly so as to enable spring clipping of the said liner in retaining manner in said annular groove, said free edges on said liner, when in situ, being located in respective grooves provided in said upstream and downstream faces of said annular flange of said labyrinth seal.

5,073,085

CERAMIC TURBOCHARGER ROTOR

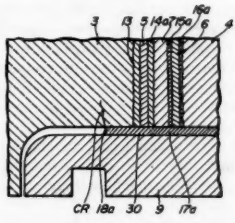
Masaya Ito, and Katsumi Miyama, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Dec. 15, 1989, Ser. No. 450,313

Claims priority, application Japan, Dec. 16, 1988, 63-319162; Aug. 22, 1989, 1-215300

Int. Cl.[5] F01D *25/00*

U.S. Cl. 415—216.1 **5 Claims**



1. A turbocharger rotor comprising:

a turbine wheel made of ceramics and having an integral shaft;

a metal shaft axially aligned with said shaft of said turbine wheel;

a first brazed joint layer interposed between said shaft of said turbine wheel and said metal shaft;

said first brazed joint layer comprising 20 to 70 wt % of silver, 1 to 20 wt % of palladium, 10 to 60 wt % of nickel, and 1 to 10 wt % of titanium;

a metal sleeve installed on said shaft of said turbine wheel, said metal shaft and said first brazed joint layer; and

a second brazed joint layer interposed between said metal shaft and said metal sleeve;

said second brazed joint layer comprising less than 1 wt % of titanium.

5,073,086

COOLED AEROFOIL BLADE

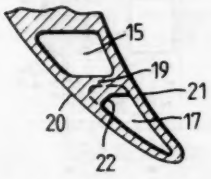
Brian G. Cooper, Derby, England, assignor to Rolls-Royce plc, London, England

Filed Jun. 19, 1991, Ser. No. 717,502

Claims priority, application United Kingdom, Jul. 3, 1990, 9014762

Int. Cl.[5] F01D 5/18

U.S. Cl. 416—96 R 6 Claims



1. An aerofoil blade suitable for the turbine of a gas turbine engine including a longitudinally extending aerofoil portion having pressure and suction flanks, said flanks being interconnected internally of said aerofoil portion by a generally longitudinally extending wall member to partially define first and second cooling fluid passage portions disposed in side-by-side generally longitudinally extending relationship, said first and second passage portions being interconnected in series fluid flow relationship by a bend passage portion, said first passage portion being adapted to direct cooling fluid to said bend portion and said second passage portion being adapted to exhaust cooling fluid from said bend portion, said wall member being locally thickened in the region of said bend portion to provide a localised progressive series narrowing and opening of the upstream end of said second passage portion in the general direction of cooling fluid flow, said locally thickened wall member portion being so configured that at said upstream end of said second passage portion, said locally thickened wall member portion progressively increases in thickness towards at least one of said flanks so as to substantially eliminate any acute angle between said at least one flank and the thickened wall member portion adjacent thereto.

5,073,087

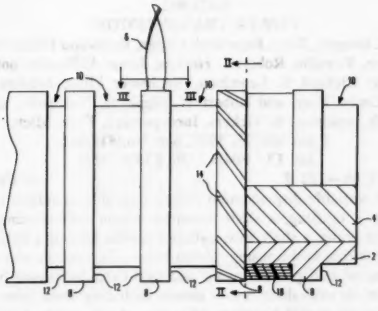
GENERATOR BLOWER ROTOR STRUCTURE

Matthew S. Harrison, Orlando, and Alan L. Obley, Altamonte Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 13, 1990, Ser. No. 508,458

Int. Cl.[5] F01D 5/32

U.S. Cl. 416—219 R 12 Claims



1. A turbine rotor assembly comprising: a rotor part for carrying at least one row of blower blades, said rotor part having the form of a cylinder having a longitudinal axis and composed of two first portions spaced apart along the longitudinal axis and each having a first outer diameter and at least one second portion extending axially between said first portions, said second portion having a second outer diameter which is less than said first diameter so that said first portions protrude radially outwardly of said second portion and each first portion has a radially extending surface constituting a boundary with said second portions, each said first portion being provided with a plurality of slots each extending from said radially extending surface and at a given angle of less than 90° relative to the longitudinal axis of said rotor part for receiving and holding the root of a respective blower blade; a plurality of blower blades, each blade having a blade root secured in a respective one of said slots in each said first portion; and blade retaining means located at said second portion and blocking said slots at each said radially extending surface, wherein said blade retaining means consist of a flexible band wrapped a plurality of time around said second portion of said rotor part and having a width selected to fill the space along the longitudinal axis between said first portions.

5,073,088

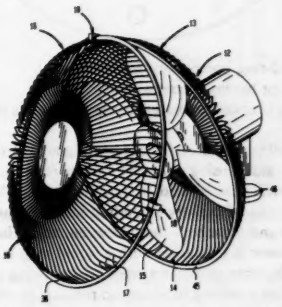
GRILL ASSEMBLY FOR PORTABLE FAN

Johnson Peng, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.

Filed Jan. 25, 1991, Ser. No. 645,727

Int. Cl.[5] F01D 25/28

U.S. Cl. 416—247 R 23 Claims



1. Environmental conditioning apparatus comprising:

conditioning means for conditioning a surrounding environment;

housing means retaining said conditioning means and comprising a flange means defining an opening, said flange means having inner and outer flange edge portions separated by oppositely directed front and rear flange surface portions;

grill means covering said opening and comprising a rim means juxtaposed to said flange means, said rim means having inner and outer rim edge portions separated by oppositely directed front and rear rim surface portions and said rear rim surface portion facing said front flange surface portion; and

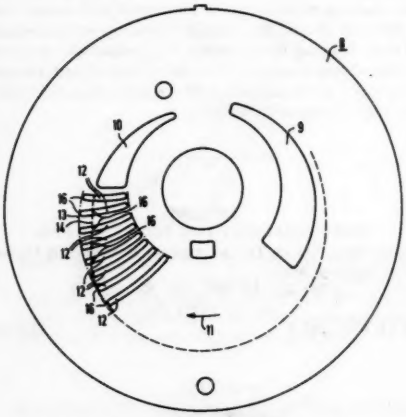
a plurality of fastening elements securing said rim means to said flange means; each of said elements being U-shaped and having an inner leg portion extending over said inner rim and flange edge portions, an outer leg portion extending over said outer rim and flange edge portions, a web portion joining said inner and outer leg portions and engaging one of said front rim surface portion or said rear flange surface portion, and a latch portion terminating one of said inner or outer leg portions and engaging the other said front rim surface portion or rear flange surface portion not engaged by said web portion.

5,073,089

LIQUID-RING COMPRESSOR

Peter Trimborn, Nuremberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 22, 1990, Ser. No. 527,012
Claims priority, application European Pat. Off., Jun. 5, 1989, 89110169
Int. Cl.[5] F04C *19/00*
U.S. Cl. 417—68 **5 Claims**



1. A liquid-ring compressor comprising:

a. a housing having a central axis;

b. bearing brackets mounted on opposite ends of said housing;

c. an impeller supported by said bearing brackets for rotation within said housing about an axis of rotation offset from the central axis of said housing, said impeller having a multiplicity of radially extending vanes forming a plurality of vane chambers therebetween, such that when the compressor is operating with a liquid ring in place, each vane chamber encloses a mass of gas being compressed, said offset resulting in eccentric rotation in which there is defined within said housing an intake region and a compression region;

d. a suction connection and a pressure connection attached to at least one of said bearing brackets;

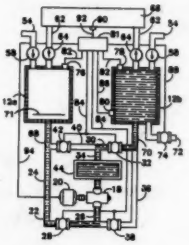
e. a control element, mounted between said at least one of said bearing brackets and said impeller, having formed therein a suction port fluidically communicating with the suction connection and the vane chambers of the impeller when the vane chambers are in the intake region, and a pressure orifice, and a plurality of supplementary ports in front of the pressure orifice with respect to the direction of rotation of the impeller, each supplementary port having an associated back-pressure valve, said pressure orifice fluidically communicating through said backpressure valves, with said pressure connection and said vane chambers of the impeller when said vane chambers are in said compression region, each of said supplementary ports having an associated flow area, the flow area of each supplementary port diminishing in size toward said pressure orifice so that the ratio of the flow area for said supplementary ports exposed by said back-pressure valves in the compression region to said gas mass existing in the vane chambers in communication with said supplementary ports is approximately constant for the prevailing nominal pressure condition of the compressor.

5,073,090

FLUID PISTON COMPRESSOR

Joseph C. Cassidy, 05750 Canary Road, West Lake, Oreg. 97493

Filed Feb. 12, 1990, Ser. No. 478,921
Int. Cl.[5] F04F *11/00*
U.S. Cl. 417—102 **3 Claims**



1. A compressor comprising:

(a) a pair of hollow chambers;

(b) conduit means for fluidly interconnecting said pair of chambers;

(c) a noncompressible transfer fluid having a volume which completely fills one of said chambers and said conduit means;

(d) pump means associated with said conduit means for pumping said transfer fluid between said chambers;

(e) means for reversing the direction said transfer fluid is being pumped each time one of said chambers becomes filled with said transfer fluid;

(f) compressible fluid inlet means associated with each of said chambers for permitting nonpressurized compressible fluid to be drawn into a respective one of said chambers when said transfer fluid is being pumped therefrom, and preventing the escape of said compressible fluid from said respective one of chambers when transfer fluid is being pumped therein;

(g) compressible fluid outlet means associated with each of said chambers for permitting compressible fluid to be pumped out of a respective one of said chambers when transfer fluid is being pumped therein, and preventing the compressible fluid which has been pumped out of said chamber from flowing back therein when said transfer fluid is being pumped therefrom;

(h) storage means fluidly connected to said compressible fluid outlet means for storing pressurized compressible fluid; and

(i) bleed means for draining transfer fluid from said apparatus when the volume of said transfer fluid

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5,073,091

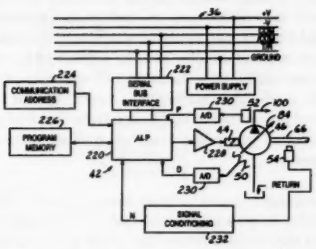
POWER TRANSMISSION

Roy T. Burgess, Troy; Rajamouli Gunda, Rochester Hills; Frank Herta, Kewadin; Robert C. Hodges; James A. Kessler, both of Troy; Richard S. Leemhuis, Rochester Hills; Michael R. McCarty, Troy, and Robert W. Stephens, Northville, all of Mich., assignors to Vickers, Incorporated, Troy, Mich.

Filed Sep. 25, 1989, Ser. No. 412,211
Int. Cl.[5] F04B *1/26;* **F15B** *13/16*
U.S. Cl. 60—222 R **36 Claims**

1. A variable displacement rotary hydraulic machine comprising: a housing; a shaft mounted within said housing for rotation about a shaft axis; cylinder means having a cylinder cavity within said housing; piston means disposed in said cavity, one of said poston means and said cylinder means being coupled to said shaft; valve means including fluid inlet and outlet ports in said housing and means of selectively connecting said cavity to said fluid inlet and outlet ports; means coupled to one of said piston means and said cylinder means within said housing for varying displacement of said piston means within said cylinder cavity as said shaft rotates about said axis;

microprocessor-based electronic control means mounted on said valve means and including means for receiving and storing electronic control signals from an external source, and means responsive to said control signals for controlling position of said displacement-varying means within said housing; and sensor means for sensing operating conditions of said machine and providing electronic sensor signals as functions thereof, including a first sensor coupled to said displacement-varying means within said housing and providing a corresponding first signal to said electronic control means; said valve means comprising a valve block, said housing including a case mounted on said valve block to form an internal cavity in which said shaft,



said cylinder means, said piston means and said displacement-varying means are positioned; said first sensor comprising means mounted on said block within said cavity engaging said displacement-varying means for biasing said displacement-varying means to a preselected displacement condition, and means coupled to said biasing means for providing said first signal; and said biasing means comprising a biasing actuator having an input coupled through said block to one of said ports, a piston engaging said displacement-varying means, a collar on said piston and a coil spring surrounding said piston between said collar and said block, said means for providing said first signal being mounted on said block and engaging said collar.

5,073,092

DIAPHRAGM PUMP

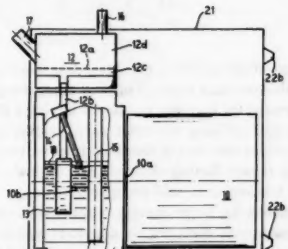
Gerhard Gebauer, Bermatingen; Wilfried Goes, Meersburg, and Otto Rosenauer, Langenargen, all of Fed. Rep. of Germany, assignors to J. Wagner GmbH, Fed. Rep. of Germany

Filed Aug. 27, 1990, Ser. No. 573,842

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1989, 3928950

Int. Cl.[5] F09B *35/02*

U.S. Cl. 417—383 **18 Claims**



1. A diaphragm pump orientable in a first operating position comprising:

a pumping component having an inlet valve and an outlet valve, receiving fluid through said inlet valve and discharging fluid through said outlet valve driven by pressure forces from propulsion liquid;

a hydraulic component, having an intake line, and holding the propulsion liquid therein and communicating propulsion liquid to said pumping component through said intake line, said intake line having a suction port submerged beneath an inventory level of the propulsion liquid residing inside the hydraulic component;

a propulsion means for delivering propulsion liquid under pressure into said pumping component;

at least one of said outlet and inlet valves comprising an unguided valve which is canted by an oblique angle upwardly relative to the horizontal in said first operating position, and maintains an upward inclination when said pump is oriented in a second position rotated 90° from said first position, said suction port of said intake line being oriented so as to be submerged beneath said inventory level in said second position.

5,073,093

SCROLL-TYPE FLUID HANDLING MACHINE

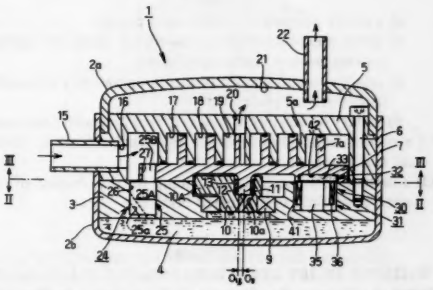
Nobukazu Takagi, Saitama, and Takeshi Seto, Nagano, both of Japan, assignors to Diesel KiKi Co., Ltd. and Seiko Epson Corporation, both of Tokyo, Japan

Filed May 25, 1990, Ser. No. 529,128

Claims priority, application Japan, May 26, 1989, 1-133822

Int. Cl.[5] F04D *5/00*

U.S. Cl. 417—410 **1 Claim**



1. A scroll-type fluid handling machine having a hermetically sealed casing enclosing therein a stationary side scroll member fixed to the casing, a movable side scroll member adapted to be rotatable in engagement with the stationary side scroll member and an electromotor used to drive the movable side scroll member, said scroll-type fluid handling machine being characterized by that said electromotor comprises a linear motor consisting of movable side magnets and stationary side coils; that said movable side magnets face the stationary side coils in the axial direction of the machine itself; and that said movable side magnets are mounted on said movable side scroll member and said stational side coils are fixed to the casing.

5,073,094

ZERO NET EXTERNAL DISPLACEMENT IMPLANTABLE PUMP AND DRIVER

Frank D. Dorman, and Bruce D. Wigness, both of Minneapolis, Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Nov. 17, 1987, Ser. No. 121,649

Int. Cl.[5] F04B *43/00;* **A61M** *37/00, 5/00;* **F16J** *3/00*

U.S. Cl. 417—412 **17 Claims**

1. An implantable anti-reflux fluid displacement compression pump-catheter system which comprises:

A) a body fluid collecting device;

B) a zero net external displacement pump including:

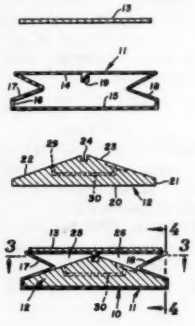
1) a pair of bellows chambers in adjacent side-by-side rela-

tion, each of said chambers having one generally flat wall which is substantially coplanar with the corresponding wall of the adjacent chamber;

2) an inlet to and a discharge outlet from each of said chambers;

3) a check valve in each of the inlet and outlet flow lines regulating one way flow through the pump; and

4) a single rocker plate overlying the coplanar walls of both of said chambers and pivotable on an axis between said chambers to permit alternate compression and expansion of each of the chambers, said pump being enclosed in an implantable housing including:



a) a cavity adapted to receive said pump;

b) pivot means journaling said rocker plate for limiting rocking motion within said cavity;

c) crank arm and link drive means operatively connected to said rocker plate; and

d) battery driven motor means for rotating said crank arm;

C) a tubular connection between said fluid collecting device and said pump; and

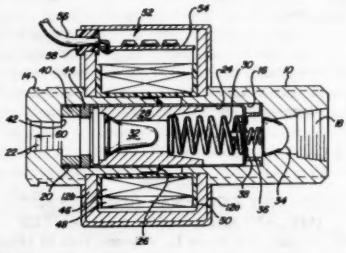
D) a catheter connected to said pump for distribution of collected body fluid to a selected body site.

5,073,095

WHISPER QUIET ELECTROMAGNETIC FLUID PUMP

James A. Thomas, Sr., Corning, N.Y., assignor to Purolator Product Company, Tulsa, Okla.

Filed Apr. 10, 1990, Ser. No. 506,935
Int. Cl.[5] F04B *17/04*
U.S. Cl. 417—417 **10 Claims**



1. A fluid pump comprising:

a housing having a cylindrically shaped piston guide, an inlet port at one end of said cylindrically shaped piston guide and an outlet port at the other end of said cylindrically shaped piston guide;

a piston disposed in said cylindrically shaped piston guide between said inlet and said outlet ports;

means for reciprocating said piston in said cylindrically shaped piston guide between a first position adjacent to said inlet port and a second position adjacent to said outlet port;

valve means cooperating with said cylindrically shaped piston guide and said piston for providing a unidirectional fluid flow through said cylindrically shaped piston guide from said inlet port to said outlet port in response to said reciprocation of said piston, said valve means being mounted to said piston;

a resilient annular bumper provided at the end of said cylindrically shaped piston guide adjacent to said outlet port; and

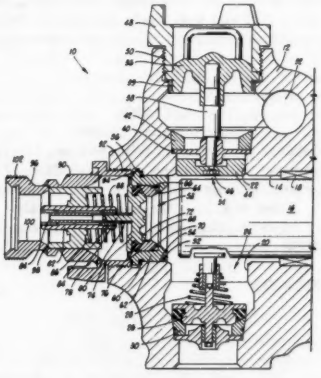
a semi-rigid annular plastic washer disposed between said resilient annular bumper and said piston, said semi-rigid annular plastic washer being displaced by said piston toward said outlet port as said piston approaches said second position and applying a uniform compressive force on said resilient annular bumper whereby any hammering noise associated with the impact of said semi-rigid annular plastic washer by said piston as said means for reciprocating said piston moves said piston from said first position to said second position is absorbed by said resilient annular bumper.

5,073,096

FRONT-DISCHARGE FLUID END FOR RECIPROCATING PUMP

Randall K. King, Duncan, and John R. Wells, Comanche, both of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Oct. 10, 1990, Ser. No. 595,348
Int. Cl.[5] F04B *21/02*
U.S. Cl. 417—454 **17 Claims**



10. A pump fluid end for a plunger pump used for pumping two-phase slurries, said pump fluid end comprising:

housing means for forming a cylinder having a plunger bore therein and defining an outlet valve pocket at an end of said cylinder and also defining an inlet valve pocket, said housing means further defining an original outlet valve pocket transverse to said plunger bore;

plunger means for reciprocating within said cylinder;

inlet valve means disposed in said inlet valve pocket for allowing a portion of the slurry to enter said cylinder;

outlet valve means disposed in the first mentioned outlet valve pocket and generally facing an end of said plunger means for allowing said portion of said slurry to be discharged from said cylinder in response to movement of said plunger means; and

plug means for closing said original outlet valve pocket.

5,073,097

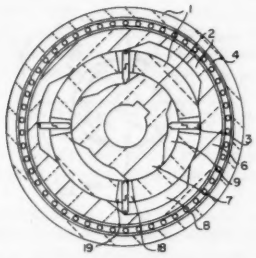
MULTI-CHAMBER ROTARY LOBE FLUID MACHINE WITH POSITIVE SLIDING SEATS

Aleksander G. Pipalov, 16282 Main St. #35G, Tustin, Calif. 92680

Continuation-in-part of Ser. No. 36,712, Apr. 9, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 264,448

Int. Cl.[5] F01C *1/34, 11/00, 19/00*

U.S. Cl. 418—175 9 Claims



1. A multi-chamber rotary fluid machine comprising:

an inner member provided with a plurality of lobes;

a ring surrounding said inner member and with said lobes defining a plurality of first fluid chambers;

a housing surrounding said ring, said housing being provided with a plurality of depressions which together with said ring define a plurality of second fluid chambers;

a plurality of sealing vanes extending through said ring and engaging with an outer surface of said inner member and an inner surface of said housing, said sealing vanes being provided in any number relative to the number of lobes of said rotor; and

a plurality of fluid communicating means provided in said ring adjacent said sealing vanes with every other of said plurality of fluid communicating means being coupled together and with each of said plurality of said fluid communicating means in communication with said first and second fluid chambers.

5,073,098

VULCANIZING FLEXIBLE JACKET USED IN POWER TRANSMISSION BELT MANUFACTURE

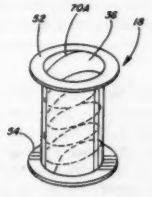
Kyoichi Mishima, Kobe, Japan, assignor to Mitsuboshi Belting Ltd., Japan

Filed Aug. 25, 1989, Ser. No. 398,640

Claims priority, application Japan, Aug. 26, 1988, 63-212786

Int. Cl.[5] B29C *35/04;* B29D *29/08*

U.S. Cl. 425—28.1 21 Claims



1. An improved jacket used to form power transmission belts, said jacket being of the type having a substantially cylindrical surface which is engaged with assembled belt components during a curing process for curing the belt components, said belt components conforming to the cylindrical jacket surface during a curing process, the improvement comprising:

vent means integrally formed with said jacket for allowing escape of air from between the cylindrical surface on the belt forming jacket and the assembled belt components with the belt components fully conformed to the cylindrical surface to thereby prevent air buildup between the jacket and fully conformed belt components that contributes to irregular belt formation during a curing process,

wherein the jacket has axial ends and the vent means comprises at least one spiral groove formed in the cylindrical jacket surface and communicating between the axial ends of the jacket.

5,073,099

HOT PRESS FOR HEAT FORMING A DISC PAD

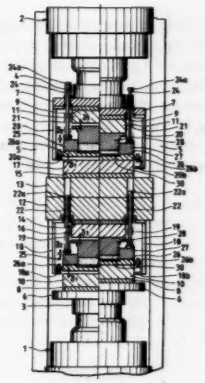
Katsunari Kayano, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Apr. 18, 1990, Ser. No. 510,223

Claims priority, application Japan, Apr. 28, 1989, 1-107168

Int. Cl.[5] B30B *7/00, 15/34*

U.S. Cl. 425—125 21 Claims



1. A hot press for heat forming a disc pad comprising:

a first press;

a first ram movable in a pressing direction and a releasing direction, said first ram being attached to said first press;

a first base;

a support means for movably supporting said first ram and for fixedly supporting said first base;

a first heat plate and a second heat plate interposed between said first ram and said first base;

a first adiabatic member and a second adiabatic member, said first adiabatic member being attached to said first heat plate and said second adiabatic member being attached to said second heat plate, said first adiabatic member and said first heat plate being movable with said first ram, said second adiabatic member and said second heat plate being mounted to said first base;

a first mold inserted between said first and second heat plates, said first mold including an upper mold having a pressing surface for contacting said first heat plate during movement of said first ram in said pressing direction, an intermediate mold, a lower mold, and a back plate, said back plate being mounted on said lower mold;

a first set of support rods each having a first end; and

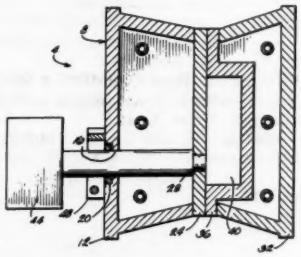
first spring means for biasing said first set of support rods during movement of said first ram in said pressing direction such that said first end of each of said set of support rods engages said intermediate mold to press said intermediate mold against said back plate before said first heat plate contacts said upper mold of said first mold.

5,073,100

CLAMP ASSEMBLY

Rick A. Schmidt, Menomonee Falls; LaVerne D. Smith, Pewaukee, and Russell J. VanRens, Milwaukee, all of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 18, 1990, Ser. No. 526,131
Int. Cl.[5] B29C *45/03*
U.S. Cl. 425—192 R 16 Claims



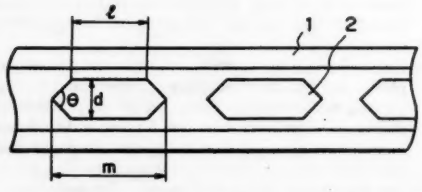
5. Injection molding apparatus comprising first and second mold pieces defining a mold cavity, a steam chest having therein an aperture, a fill gun extending through said aperture and communicating with said mold cavity, and means mounted on said steam chest for clampingly engaging said fill gun, said means including a clamp assembly comprising a collar mounted on said steam chest, and cam means for selectively clamping said collar around said fill gun.

5,073,101

INFORMATION RECORDING MEDIUM, PRODUCTION PROCESS AND MOLDING DIE FOR SUBSTRATE THEREFOR

Hiroyuki Imataki; Mizuho Hiraoka, both of Kawasaki; Tomoyuki Tamura, Yokohama, and Tetsuya Satoh, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 301,145, Jan. 25, 1989, Pat. No. 4,956,214. This application Jun. 27, 1990, Ser. No. 544,652
Claims priority, application Japan, Jan. 25, 1988, 63-15237
Int. Cl.[5] B29C *43/02*
U.S. Cl. 425—385 5 Claims



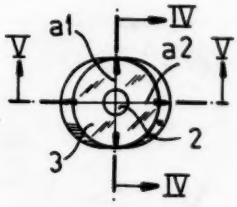
1. A molding die for an information recording medium substrate having a prescribed unevenness pattern comprising a track forming portion and information pit forming portions; said information pit forming portions having a planar shape of a polygon; at least one diagonal of said polygon being substantially parallel to said track forming portion.

5,073,102

DIE PLATE FOR EXTRUSION, WITH DISCHARGE HOLES EQUIPPED WITH FITTED INSERTS

Andrea Guggiari, Como, Italy, assignor to Pomini Farrel S.P.A., Castellanza, Italy

Filed Nov. 29, 1990, Ser. No. 620,540
Claims priority, application Italy, Dec. 15, 1989, 22709 A/89
Int. Cl.[5] B29C *47/00*
U.S. Cl. 425—461 5 Claims



1. An apparatus for extruding a material, said apparatus comprising:

a die plate formed with spaced apart inner and outer sides;

at least one discharge hole centered on a hole axis and extending through said plate between said inner and outer sides;

a seat surrounding said hole and coaxial therewith; and

an insert mounted in said seat, said insert being formed with:

a base surface perpendicular to said hole axis having a longitudinal dimension in a first direction and a transverse dimension in another direction angularly offset from said first direction about said hole axis, and

an outer surface parallel to and spaced axially outward from said base surface, said outer surface having a smaller dimension in said first direction than said longitudinal dimension of said base surface, said insert being axially insertable into said seat, said seat being formed with:

an inner surface spaced axially inward from said outer side of said plate and having a dimension in said first direction sufficient for receiving said base surface of the insert, and

a peripheral surface extending axially outwardly from said inner surface and meeting said outer side of said plate at an outer edge defining an opening having a dimension in said first direction at least equal to said longitudinal dimension of said base surface and a dimension in a second direction at least equal to said transverse dimension of said base surface but less than said longitudinal dimension of said base surface, said peripheral surface having an undercut region accommodating said base surface in a locking angular position of said insert wherein said longitudinal dimension of said base surface is angularly offset from said second direction and axially arresting said insert in said seat in said angular position.

5,073,103

INTEGRAL SLIDING MEMBER OF A SLIDE FASTENER AND THE MOLDING DEVICE THEREOF

Ching-Fu Liao, Taipei, Taiwan, assignor to Hseng Chee Enterprise PTE, Ltd, Taipei Hsien, Taiwan

Filed Oct. 1, 1990, Ser. No. 590,907
Int. Cl.[5] B29C *45/16, 33/44, 41/42*
U.S. Cl. 425—545 1 Claim

1. A molding device for injection molding a sliding member of a slide fastener, comprising:

a first mold;

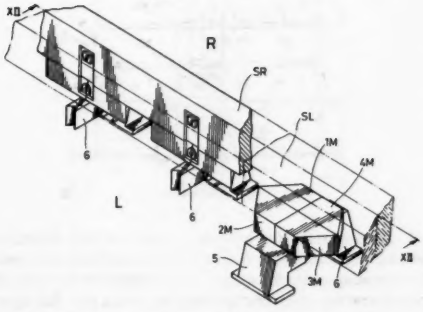
a second mold movable toward and away from said first mold, thereby closing and opening said molding device;

at least one set of molding parts;

said at least one set of molding parts including:

a first upper movable molding part in said first mold;

a second upper movable molding part in said first mold;
a third upper movable molding part in said second mold;
a fourth upper movable molding part in said second mold;
said first, second, third and fourth upper molding parts being movable away from each other on completion of molding said sliding member;
each of said upper movable molding parts including first and second independent and chain-linking sub-cavities therein;
all of said first and second independent chain-linking sub-cavities in said first, second, third and fourth movable molding parts, when all four upper movable molding parts are brought together, fitting together to form first and second independent, but chain-linking cavities;
said first cavity being a first portion of a pulling tab said sliding member;
said second cavity being a ring-shaped portion of said sliding member;
said first portion of a pulling tab and said ring-shaped portion of said sliding member being independent and chain-linked;
each of said first, second, third and fourth upper movable molding parts including a surface which is slanted with respect to a direction of relative movement between said first and second molds;



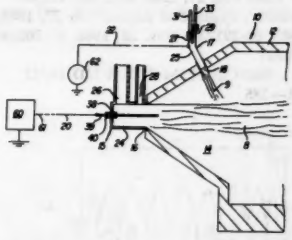
all of said surfaces being effective for guiding a movement of its respective upper movable molding part with respect one of said first and second molds;
a first lower molding part affixed to said first mold;
a second lower molding part affixed to said second mold for forming, together with said two molds and said upper movable molding parts, a slide body of said slide fastener;
a first upper stationary molding part detachably affixed to said first mold;
a second upper stationary molding part detachably affixed to said second mold;
at least one of said first and second upper stationary molding parts including a tab sub-cavity which, when said first and second upper stationary molding parts are brought together, form a cavity for a second portion of said pulling tab;
said tab sub-cavity communicating with said first cavity, when said mold is closed, whereby said second portion of said pulling tab is integrally molded with said first portion of said pulling tab; and
inclusion of said tab sub-cavity in said first and second upper stationary molding parts permitting easy change in shape of said second part, without disturbing a remainder of said molding apparatus.

5,073,104

FLAME DETECTION

Kenneth G. Kemlo, Lambton, Australia, assignor to The Broken Hill Proprietary Company Limited, Melbourne, Australia

Continuation-in-part of Ser. No. 339,867, Apr. 17, 1989, abandoned, which is a continuation of Ser. No. 61,343, May 11, 1987, abandoned. This application Sep. 21, 1989, Ser. No. 410,212
Int. Cl.[5] F23D *5/12*
U.S. Cl. 431—12 **13 Claims**



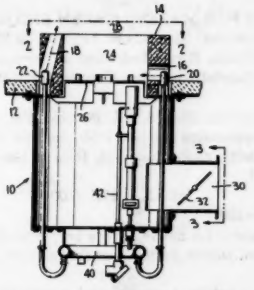
1. A method of detecting the condition of a flame, comprising the steps of:
establishing a flame having an emf;
electrically conducting the emf generated by the flame as a signal to a sensor through an electrically isolated conductor means, and
sensing with said sensor an electrical parameter which is a measure of said emf of the flame;
wherein said electrical parameter is a parameter selected for its intrinsic dependence on the presence of the flame and substantial independence of its value from the degree of connection of the flame with the conductor means and from an amplitude of the signal received at said sensor, and wherein the parameter selected is the ratio of the A.C. and D.C. signal levels at said sensor.

5,073,105

LOW NO_x BURNER ASSEMBLIES

Richard R. Martin, Tulsa; G. Richard Ogden, Bristow, and Paul M. Rodden, Sand Springs, all of Okla., assignors to Callidus Technologies Inc., Tulsa, Okla.

Filed May 1, 1991, Ser. No. 694,082
Int. Cl.[5] F23L *7/00*
U.S. Cl. 431—116 **7 Claims**



1. A burner assembly comprising in combination a burner block, a flame holder within said burner block and positioned below the upper surface of said burner block to form a combustion zone within said burner block, a plurality of holes in said burner block substantially horizontally disposed therein and a primary fuel jet positioned at each of said holes for introducing a primary fuel across the face of said flame holder without substantial axial fuel injection, and means for introducing com-

bustion air into said combustion zone; said horizontally disposed holes being positioned and said primary jets being constructed and arranged to draw gas surrounding said burner assembly into said combustion zone.

5,073,106

GAS BURNER

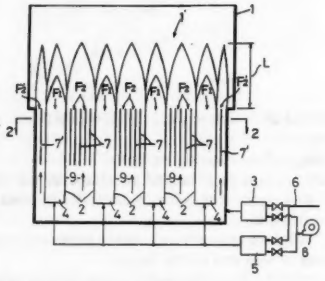
Hajime Toyonaga; Toshio Nishida; Yasuo Takeishi, and Masao Shiomi, all of Osaka, Japan, assignors to Osaka Gas Co., Ltd., Osaka, Japan

Filed Feb. 27, 1989, Ser. No. 315,909

Claims priority, application Japan, Feb. 27, 1988, 63-45494; Nov. 17, 1988, 63-291731; Nov. 28, 1988, 63-300246; Dec. 23, 1988, 63-326917

Int. Cl.[5] F23M *3/06*; F23D *14/12*

U.S. Cl. 431—285 **7 Claims**



1. A gas burner comprising:

a plurality of first flame openings for discharging a high-concentration mixture gas containing a fuel gas and a combustion air;

and a plurality of second flame openings for discharging a low-concentration mixture gas with a higher air excess ratio than said high-concentration mixture gas;

wherein said first flame openings and said second flame openings are arranged alternately with each other, and

wherein each said second flame opening includes a rectifying member partitioning the entire or most of the interior of said second flame openings into a plurality of sections each with a width not greater than 2 mm, all or most of adjacent pairs of said flame openings being spaced apart with an interdistance not less than 8 mm.

5,073,107

APPARATUS FOR MAKING GREEN BRIQUETTES FOR FORMING SI, SIC OR FERROSILICON

Gert-Wilhelm Lask, Berus, Fed. Rep. of Germany, assignor to Applied Industrial Materials Corporation AIMCOR, Deerfield, Ill.

Division of Ser. No. 220,616, Jul. 18, 1988, Pat. No. 4,975,226. This application Sep. 28, 1990, Ser. No. 590,479

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724541

Int. Cl.[5] F27B *7/00*

U.S. Cl. 432—103 **4 Claims**

1. An apparatus for making green briquettes for the production of silicon, silicon carbide, or ferrosilicon, the apparatus comprising:

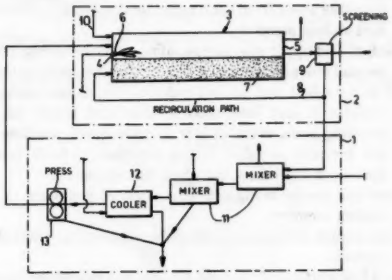
means for combining quartz sand, a carbon carrier and a bituminous binder into quartz-sand blanks;

a rotary drum furnace having an entry and an exit;

a bed of quartz sand in the furnace;

means for displacing the quartz-sand blanks from the combining means through the furnace entry into the quartz-sand bed, displacing them in the quartz-sand bed through the furnace, and moving them out of the quartz-sand bed through the furnace exit;

means including burners in the furnace for directly heating the quartz-sand bed and thereby indirectly heating the



blanks therein to a temperature up to approximately 500° C. by combustion of volatile substances and air.

5,073,108

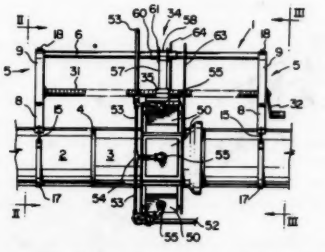
APPARATUS FOR HEATING PIPE

Alan Kirby, 3880 - 74 Avenue, Edmonton, Alberta, Canada T6B 2P7

Filed Dec. 7, 1989, Ser. No. 447,231

Int. Cl.[5] F24J *3/00*; E03B *7/14*

U.S. Cl. 432—225 **9 Claims**



1. An apparatus for heating a pipe and heat shrinking a shrinkable plastic sleeve onto the pipe comprising track means for mounting in spaced apart, parallel relationship to the pipe; main frame means for clamp mounting on the pipe for supporting said track means in said spaced apart, parallel relationship to the pipe; carriage means slidably mounted on said track means for movement therealong; drive means for moving said carriage means along said track means parallel to the pipe; and annular heater means carried by said carriage means for surrounding with clearance said pipe and a shrinkable plastic sleeve thereon and for movement with said carriage means along said track means, whereby the pipe can be heated along a substantial length thereof and a plastic sleeve shrunk thereon.

5,073,109

FULLY ADJUSTABLE ARTICULATOR DEVICE

Khaled A. H. El Hadary, 1066 Gamal Abdel Naser Street, Alexandria, Egypt

Filed Feb. 4, 1991, Ser. No. 649,508

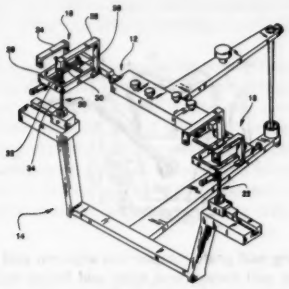
Claims priority, application Egypt, Feb. 4, 1990, 52/90

Int. Cl.[5] A61C *11/00*

U.S. Cl. 433—57 **3 Claims**

1. An articulator device for establishing the articulated movement of a mandible of a jaw relative to a maxilla of a jaw comprising a lower part, an upper part positioned above the lower part and having two spaced apart condylar houses each including an outer vertical frame, a middle horizontal frame and an inner vertical frame, each for mounting a sheet or plate

having a curvalinear edge surface representing movement of a mandible, and first and second condylar rods each adjustably



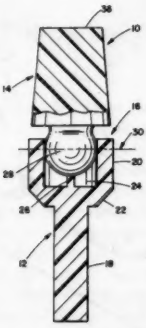
mounted to the lower part and having an upper vertical rod portion and an upper horizontal rod portion.

5,073,110

ARTICULATING BALL COPING AND ASSOCIATED DEVICES

Noram K. Barbone, Mansfield, Ohio, assignor to Implant Plastics Corporation, Mansfield, Ohio

Filed May 21, 1990, Ser. No. 527,002
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 **6 Claims**



1. In a copying insert adapted for use with an endosseous dental implant anchoring means including shaft means for insertion into an opening in said anchoring means and a head end for engaging and supporting a dental prosthesis the improvement wherein said insert is molded entirely of a resinous plastic and said head end and said shaft means constitute separate elements joined by a ball and socket type joint for allowing angular positioning of said head end relative to said shaft means, said socket of said joint including adjustment means in the form of an elongated member molded in the interior of said socket to extend axially thereof for allowing axial adjustment and positioning of said ball therein by cutting the elongated member to a desired length.

5,073,111

ANATOMICAL RESTORATION DENTAL IMPLANT SYSTEM

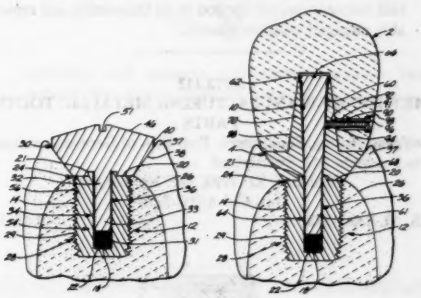
Fereidoun Daftary, 5015 Orrville, Woodland Hills, Calif. 91367

Filed Oct. 20, 1989, Ser. No. 424,901
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 **24 Claims**

1. A dental implant system implantable in the gingival tissue and the alveolus of the jaw bone comprising:

an implantable fixture having proximal and distal end portions, the proximal end portion having means for being embedded in opened gingival tissue and the alveolus of the jaw gone, the distal end portion being accessible from the outer surface of the jaw bone, the fixture being made of a substance permitting healing of the opened gingival tissue and growth of the jaw bone about the fixture, the fixture further including a hollow extending from an opening in the distal end portion towards the proximal end portion, the hollow having threads along at least a portion of its length;

means for sealing the hollow portion of the fixture during a period after implantation in which the jaw bone is growing about the proximal portion of the fixture;



means for providing a predetermined contour to the gingival tissue adjacent the distal end of the fixture opened for the removal of the sealing means, such that the gingival tissue re-heals in a contour reverse to that of the contour of said means;

a tooth analogue;

abutment means for supporting the tooth analogue, engagable with the implantable fixture and having the same contour as the fixture sealing and gingival tissue contouring means, such that the abutment means makes a tight fit with the healed gingival tissue adjacent the distal end of the fixture; and

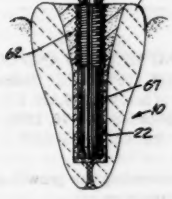
means for releasibly attaching the tooth analogue to the abutment means.

5,073,112

ACTIVE/PASSIVE DENTAL POSTS

Eberhard Weil, Friedberg, Fed. Rep. of Germany, assignor to Coltene/Whaledent, New York, N.Y.

Filed Nov. 8, 1990, Ser. No. 611,177
Int. Cl.[5] A61C *5/08*
U.S. Cl. 433—221 **20 Claims**



1. A dental post assembly for securely retaining a dental restoration on a prepared tooth stub in which the tooth stub has an enlarged bore in the canal section of the tooth stub, comprising:

a sleeve made of curable hardened adhesive and securable to a surface of said canal section, said sleeve being formed by

positioning a mandrel having an active threaded portion and a passive portion in the tooth stub with the passive portion of the mandrel in the bore of the tooth stub, wherein at least the active portion of the mandrel is surrounded with said curable adhesive which hardens to form said sleeve, said sleeve having an outer peripheral wall which is in direct contact with and secured to the surface of the canal section when said sleeve is formed, said sleeve having a closed bottom wall and including an active threaded portion and a passive portion; and

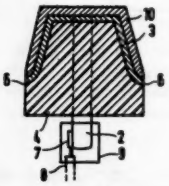
an elongated rod having an active threaded portion and a passive portion, said active portion of said rod having threads of a pitch and diameter corresponding to a pitch and diameter of threads of said active threaded portion of said sleeve to permit the rod to be threadedly and removably engaged with the sleeve.

5,073,113

METHOD OF MANUFACTURING METALLIC TOOTH PARTS

Wolfgang Hornig, Sandhausen, Fed. Rep. of Germany, assignor to Prodenta AG, Switzerland

Filed Dec. 12, 1990, Ser. No. 626,686
Int. Cl.[5] A61C *5/10*
U.S. Cl. 433—223 **5 Claims**



1. A process for producing metal denture prostheses wherein a mold defining a cavity representing the mouth part to be treated is made from an electrically non-conducting material, the inner cavity is then lined with an electrically conducting layer and the lined cavity is filled with a filler material into which at least one rod is introduced to form a positive pattern formed by the electrically conducting layer, the filler material and said rod, and the positive pattern is removed from the mold characterized by using as filler material an electrically non-conducting material suitable for emmersion in an electrolyte which increases in volume under the action of heat, introducing the positive pattern into a heated electrolyte and electrolytically depositing at least one layer of a metal on said electrically conducting layer of said positive pattern to form thereby the denture prosthesis, removing said positive pattern with the galvanically deposited layer from said electrolyte, and after cooling, separating the partial denture prosthesis from the positive pattern.

5,073,114

BONE GROWING METHOD AND COMPOSITION

Steven G. Detsch, 4115 The Hill Rd., Bonita, Calif. 92002

Continuation-in-part of Ser. No. 159,126, Feb. 23, 1988, Pat. No. 4,911,641. This application Oct. 10, 1989, Ser. No. 419,377
Int. Cl.[5] A61K *6/03*
U.S. Cl. 433—228.1 **21 Claims**

1. A method of promoting the growth of bone in a living creature comprising the steps of:

a. providing a structural support material;

b. providing a material having attachment means;

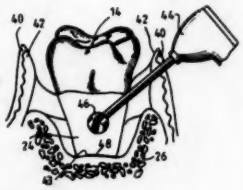
c. providing a source of bone morphologic protein;

d. providing a source of collagen;

e. providing at least one material having cell growth means;

f. mixing said structural support material, said attachment material, said source of bone morphologic protein, and said source of collagen to form a graft composition;

g. surgically operating on the living creature to expose living bone;



h. inserting said graft composition adjacent said living bone to treat said living bone after said living bone has been surgically exposed; and

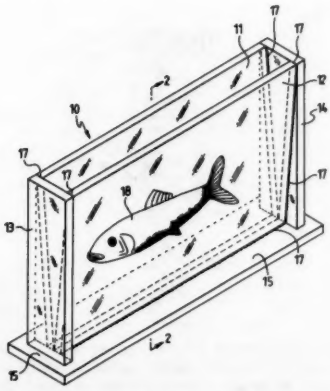
i. surgically covering said living bone and said adjacently located graft composition.

5,073,115

TEACHING - PHOTOGRAPHIC TANK

William M. Howell, 2200 Vesthaven Way, Birmingham, Ala. 35216

Filed Nov. 6, 1990, Ser. No. 609,642
Int. Cl.[5] G09B *23/36*
U.S. Cl. 434—297 **20 Claims**



1. An article for restraining a live fish for observation and photographic purposes, comprising:

(a) two convergent planar viewing members forming an upwardly opening wedge-shaped structure wherein a fish may be wedgingly engaged between said convergent planar viewing members;

(b) two vertically oriented end members each having the ends of said upright opening wedge-shaped structure connected thereto; and

(c) a rigid base member supporting said convergent planar viewing members and said end members.

5,073,116

SURFACE MOUNT LCC SOCKET

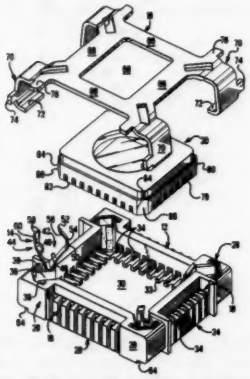
Hoy S. Beck, Jr., Lexington, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 1, 1991, Ser. No. 664,154
Int. Cl.[5] H01R *9/09, 13/62*
U.S. Cl. 439—71 **6 Claims**

1. A socket (10) for electrically interconnecting a leadless chip carrier to a substrate, said socket comprising:

a dielectric housing (12) having side walls (24,26) and corner blocks (28) which define a central opening (30) for receiving a leadless chip carrier, said side walls (24,26) having cavities (34) opening into said central opening (30), and further having a retaining bar (142) in each of said cavities (34);

a plurality of contact elements (16) formed from conductive material and having a rigid base section (92) with first and second spring arms (100,102) extending outwardly from respective ends (96,98) of said base section (92) and a retaining member (104) having a barb (138) extending outwardly from said base section (92) intermediate and parallel to said spring arms (100,102), said second spring arm (102) having a first straight portion (120) with a barb



(122) thereon said elements (16) being disposed in respective cavities (34) in said housing (12) with said base sections (92) being parallel to the height of said housing (12) and said first springs arm (100) extending into said central opening (30) for electrical engagement with a leadless chip carrier which may be disposed therein and said second spring arm (102) extending outwardly from said housing (12) for electrical engagement with circuits on a substrate on which said socket may be mounted and said barbs (122,138) on said second spring arm (102) and said retaining member (104) respectively engaging opposite sides of said retaining bar (142); and

a cover (18) for holding a leadless chip carrier in said central opening and for biasing said carrier against said first springs arms (100).

5,073,117

FLIP-CHIP TEST SOCKET ADAPTOR AND METHOD

Satwinder Malhi, Garland; Oh K. Kwon, and Shivaling S. Mahant-Shetti, both of Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 330,839, Mar. 30, 1989, Pat. No. 5,006,792. This application Dec. 27, 1990, Ser. No. 620,221

Int. Cl.[5] H01R *9/09*

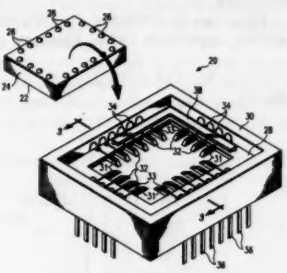
U.S. Cl. 439—71 **20 Claims**

1. An apparatus for providing electrical connection to integrated circuit die, comprising:

a base;

a support fixed to said base; and

a plurality of pressure-sensitive contacts supported by said support to allow said contacts to deflect toward said base such that a die may be electrically connected to said



contacts, said contacts comprising cantilever beams formed from a semiconductor material.

5,073,118

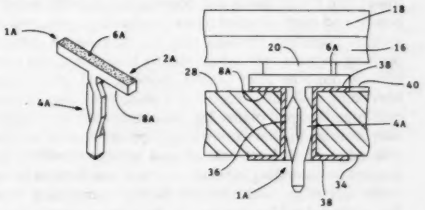
SURFACE MOUNTING AN ELECTRONIC COMPONENT

Dimitry G. Grabbe, Middletown, and Richard F. Granitz, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 8, 1988, Ser. No. 281,566

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—71 **8 Claims**



1. A circuit board for the surface mounting thereon of an electronic component having external contact pads arranged in a predetermined pattern on an interface surface thereof, the circuit board comprising;

a major mounting surface and an opposite major surface;

a multiplicity of metal lined through holes each opening into both of said major surfaces and having an extension in the form of a land surrounding the hole and lying on said major mounting surface;

electrically conductive strips electrically connected to the metal linings of predetermined ones of the said through holes; and

a plurality of stamped metal electrical terminals arranged according to said predetermined pattern and each having a shank extending into the metal lining of a respective one of said holes and being electrically connected to said metal lining, and a head attached to said shank having an inner face thereof in surface to surface contact with said land, said head presenting a gold covered, contact pad engaging, flat outer face disposed normal to said shank and directed away from said mounting surface, for engagement by a respective contact pad of said electronic component.

5,073,119

SURFACE MOUNT ELECTRICAL CONNECTOR

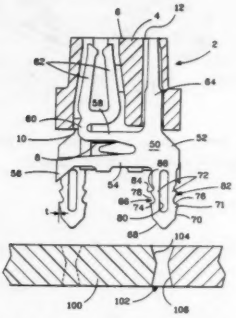
Lucas Soes, Rosmalen, Netherlands, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 10, 1990, Ser. No. 507,344

Claims priority, application United Kingdom, Apr. 13, 1989, 8908411

Int. Cl.[5] H01R *13/428*

U.S. Cl. 439—82 **16 Claims**



1. An electrical connector for connection to a printed circuit board, comprising:

an insulating housing having a mating face for interconnection of mating conductors, and a lower face for positioning towards the printed circuit board;

a plurality of electrical contacts positioned within said housing with first conductor contacting sections adjacent to said mating face, surface mount contact portions extending from an edge stamped planar leg and positioned adjacent to the lower face, and compliant interconnection sections extending from said housing and below said lower face for retaining said housing to said printed circuit board, said edge stamped planar leg having a stamped out section extending through said leg defining an elongate opening forming two independently movable spring members on opposite sides of said opening, said spring members being resiliently flexible in a plane extending through said edge stamped planar leg, said compliant interconnection sections further comprising a projection on an outer side edge of at least one of said spring members, said projection extending beyond a vertical axis formed by said outer side edge, said contacts further comprising means for cutting slot-like passages in the printed circuit board, where the width of the passages is substantially equal to the width between said spring members' outer side edges, said compliant interconnection sections being adapted for resilient connection with the slot-like passages in the printed circuit board, said spring members being resiliently compressible and retractable to an extent equal to the difference between the width of the slot-like passages and the width between said outer side edges.

5,073,120

POWER DISTRIBUTION UNIT

Frank Lincoln, Dunwoody, Ga., and Victor Slack, Lewisville, N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 25, 1991, Ser. No. 645,954

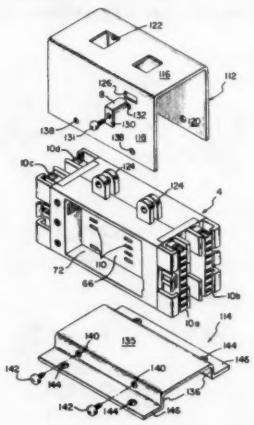
Int. Cl.[5] H01R *4/66*

U.S. Cl. 439—92 **18 Claims**

1. A power distribution unit comprising:

bussing connection means having insulating housing means having side walls and end walls, where at least one of said end walls comprises through ports and where said member comprises a plurality of internal side-by-side channels, each said channel being in communication with at least two of said through ports, at least one of said side walls including an opening therethrough in communication with one of said channels;

a plurality of electrical power busses positioned in said channels, said busses comprising at least one ground bus, one neutral bus and one hot bus, said ground bus being aligned with said opening in said one channel, said busses being positioned in a stacked array and each comprising a generally flat strip and at least two electrical terminals extending from ends of said busses and insulatively positioned in said at least two through ports for further distribution of power, wherein at least one edge of said ground bus comprises a contact portion folded over about said strip, thereby forming a receptacle portion between said folded over contact and said strip;



metallic grounding shell means at least partially surrounding said housing, leaving said through ports exposed, said metallic grounding shell means comprising a slot therethrough aligned with said opening and said ground terminal; and

a grounding tab positioned through said slot and electrically connected to said ground bus and electrically secured to said metallic grounding shell, thereby grounding said ground terminal to said metallic grounding shell means.

5,073,121

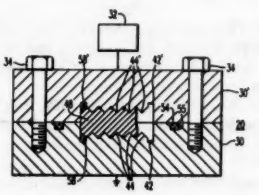
LOW IMPEDANCE CONNECTOR

Paul E. Jaenke, Arnold, Md., and Ronald E. Armiger, Millersville, Pa., assignors to Westinghouse Electric Corp, Pittsburgh, Pa.

Filed Nov. 28, 1990, Ser. No. 618,867

Int. Cl.[5] H01R *4/30, 4/26*

U.S. Cl. 439—92 **13 Claims**



1. Low impedance electrical connection apparatus comprising:

a) first and second electrically conducting members, at least

one of which is for electrical connection to electrical apparatus;

b) clamping means for releasably maintaining said members in intimate contact when in use;

c) each said member including a cavity which faces the cavity of the other member when said members are clamped together thereby forming a hollow chamber;

d) each said cavity including at least one protuberance which projects into said chamber;

e) an electrically conductive grounding disk for placement within said chamber and being of a softer material than said members and protuberances;

f) said grounding disk and said cavity being constructed and arranged that when said grounding disk is inserted into said chamber and said members are clamped together said protuberances will dig into said grounding disk to make intimate electrical contact with and between said members.

5,073,122

LOCK-OUT ENCLOSURE FOR POWER CONNECTOR

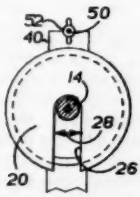
Ronald A. Burke, Jr., 6650 Loud Dr., Oscoda, Mich. 48750

The portion of the term of this patent subsequent of Sept. 18, 2007 has been disclaimed.

Continuation of Ser. No. 339,645, Apr. 18, 1989, Pat. No. 4,957,445. This application May 22, 1990, Ser. No. 527,014

Int. Cl.[5] H01R *13/44*

U.S. Cl. 439—134 **23 Claims**



1. A lock-out enclosure for a connector attached to a power supply line comprising:

a cylindrical tube receivable over said connector, said cylindrical tube having a first end and a second end opposite said first end, both said first end and said second end being open;

a cap mounted to said first end of said cylindrical tube, said cap having an end wall, a cylindrical flange extending in a direction normal to said end wall, and a power line slot extending through said end wall to a central region thereof;

means for permanently locking said cylindrical flange to said first end of said cylindrical tube, said means preventing removal of said cap from said first end of said cylindrical tube once said cylindrical flange is locked to said first end; and

closure means for closing said second end of said cylindrical tube opposite said one end to prevent the removal of said connector from inside said cylindrical tube.

5,073,123

SELF TERMINATING TAP CONNECTOR

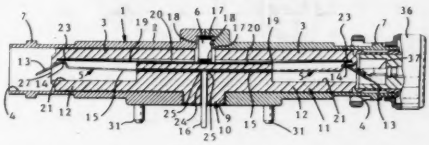
Norman R. Birch, Jacobus; James G. Dunbar, Lancaster; Harold W. Kerlin, Port Royal; Wilmer L. Sheesley, Dauphin, and Edward C. Vees, Camp Hill, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 519,968, May 7, 1990, Pat. No. 5,030,122, which is a continuation-in-part of Ser. No. 340,979, Apr. 20, 1989, abandoned, and a continuation-in-part of Ser. No. 354,070, May 19, 1989, abandoned. This application Feb. 25, 1991, Ser. No. 660,505

The portion of the term of this patent subsequent to Jul. 9, 2008, has been disclaimed.

Int. Cl.[5] H01R *17/04, 33/96*

U.S. Cl. 439—188 **11 Claims**



1. A shielded electrical connector assembly comprising; an electrical conductor having an elongated conductive end portion and a conductive tap portion for intimate disconnect coupling to a corresponding electrical connector within the wall of a panel; a dielectric support for the conductor having dielectric portions encircling respective ones of said elongated conductive end portions and said tap portion; a hollow conductive shell having individual sleeve portions abutting one another and encircling respective said dielectric portions of the dielectric support;

wherein the electrical conductor comprises a conductive switch contact connected to a corresponding signal terminating conductor, said switch contact being carried by the dielectric support for disconnect connection to an electrical contact inserted into the hollow conductive shell, and an electrical circuit element in contact with the shell constructed for disconnect coupling with the switch contact upon withdrawal of the electrical contact from within the conductive shell, whereby the switch contact is terminated electrically to the shell through the circuit element.

5,073,124

ELECTRICAL INTERCONNECTION SYSTEM UTILIZING FLUID PRESSURE DEFORMED TUBULAR CONTACT

Francis R. Powell, Cheshire, Conn., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 20, 1990, Ser. No. 556,062

Int. Cl.[5] H01R *4/60;* **H01H** *35/30*

U.S. Cl. 439—197 **33 Claims**

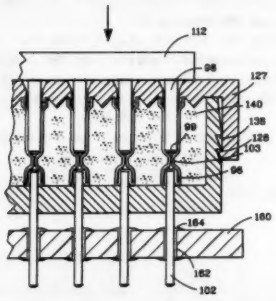
22. An interconnection system adapted to receive and interconnect an electronic package including an array of post contact members, which extend axially parallel in a given pattern

said system including a plurality of first contacts each having a tubular cross section and a conductive surface and each formed of a thin wall plastic material readily deformable in a radically inward sense,

the said first contacts being arranged in axially parallel patterns matching axially disposed patterns of post contact members of the package,

a housing having a means sealing the interior of the housing with said first contact members mounted in said housing in said pattern and a fluid medium contained within said

housing and means to pressurize said fluid medium to drive said first contacts radially inwardly into engagement



with the said post contact members of said package to provide an interconnection thereto.

5,073,125

ELECTRICAL CONNECTOR COMPRISING AN INTERMEDIATE CONNECTION ELEMENT FOR CONNECTING AND DISCONNECTING BETWEEN A FIRST AND SECOND CONNECTION ELEMENT

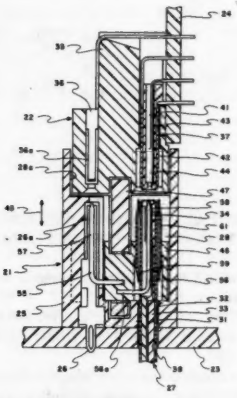
Osamu Hashiguchi; Yukiharu Tayama, and Shigeharu Yamamura, all of Tokyo, Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of Tokyo, Japan

Filed Apr. 6, 1990, Ser. No. 505,788

Claims priority, application Japan, Apr. 7, 1989, 1-40459[U]; Apr. 7, 1989, 1-40460[U]

Int. Cl.[5] H01R *13/62*

U.S. Cl. 439—310 **15 Claims**



1. An electrical connector comprising:

a first connection element comprising a first conductive contact of a socket type;

a second connection element comprising a second conductive contact of a socket type facing in a predetermined direction toward said first conductive contact;

a third connection element comprising a connecting member of a pin type closely fitted in said first conductive contact, said connecting member being movable in said predetermined direction for electrically connecting said first conductive contact to said second conductive contact with said connecting member closely fitted into said second conductive contact, said third connection element further comprising a movable insulator which is mechanically coupled to said connecting member and which is movable in said predetermined direction; and

drive means for driving said movable insulator in said predetermined direction, said drive means being movable in a particular direction which is perpendicular to said predetermined direction for engaging said movable insulator to make said movable insulator move in said predetermined direction when said drive means is moved in said particular direction.

5,073,126

ELECTRICAL CONNECTOR HOUSING HAVING CONDUCTOR-RETENTION MEANS

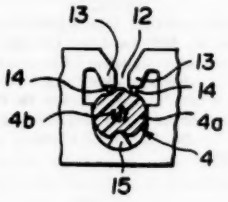
Shoji Kikuchi, Hiratsuka, and Tetsuyuki Furuya, Yokohama, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 112,970, Oct. 23, 1987, abandoned. This application Oct. 30, 1990, Ser. No. 608,603

Claims priority, application Japan, Nov. 7, 1986, 61-170968

Int. Cl.[5] H01R *13/58*

U.S. Cl. 439—452 **1 Claim**



1. An electrical connector, comprising:

a dielectric housing having aligned contact-receiving and conductor-retaining sections opening outwardly;

an electrical contact having a termination section disposed in said contact-receiving section and a soldering leg extending outwardly from a bottom surface of said housing for soldered connection to a circuit board;

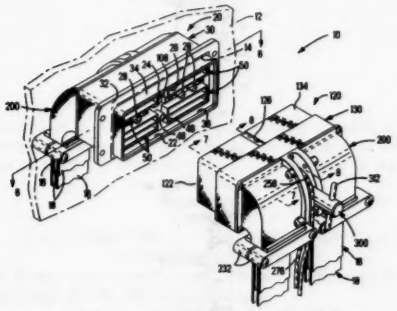
said conductor-retaining section having a generally semicircular portion and including a pair of resilient conductor-retention members extending upwardly from said semicircular portion, said members including vertical legs and inwardly-directed legs, with the inwardly-directed legs being spaced from and facing one another thereby providing a groove therebetween whereby an electrical conductor can be inserted through said groove into the semi-circular portion past free ends of the inwardly-directed legs; and

projections having sharp edges provided at said free ends of said inwardly-directed legs and also extending upwardly from a bottom of said semi-circular groove, said projections being disposed in a place perpendicular to an axis of said conductor-retaining section so that said projections firmly engage the insulation of the conductor when inserted within the conductor-retaining section to provide an axial strain relief thereon and to prevent the insulation of the conductor from shrinking away from the termination between the conductor and the termination section when heat is applied to said soldering leg.

5,073,127
STRAIN RELIEF ASSEMBLY FOR FLAT CABLE CONNECTOR

John K. Daly, Scottsdale; Earl R. Kreinberg, Phoenix, and Marty E. Adcock, Scottsdale, all of Ariz., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 511,662, Apr. 20, 1990, Pat. No. 5,007,858.
This application Jan. 31, 1991, Ser. No. 649,092
Int. Cl.[5] H01R *13/533, 13/595*
U.S. Cl. 439—473 6 Claims



1. A strain relief assembly for a connector used with a plurality of flat cables, each flat cable including at least one flat conductor of substantial width and incremental thickness, the connector being suitable for housing terminations of terminal means to respective ends of ones of the cable conductors for transmission of electrical power at substantial levels of current and voltage across a mating interface, at least two said flat cables extend rearwardly from a rearward face of a shell member of the connector, and the strain relief assembly being securable to the rearward shell face, said assembly comprising:

at least first and second members, each said first and second member including lateral walls joined to a common end wall of said member at a first side remote from the other of said first and second members and extending laterally from said common end wall to edges at an opposed second side such that said edges are spaced apart to receive lateral edges of at least a respective one of said flat cables therebetween extending form terminations thereof housed within said shell, said first and second members securable together upon being moved laterally relatively together from respective said lateral edges of said flat cables to define at least one cable passageway extending from forward portions of said first and second members adjacent said rearward shell face to a cable exit such that said at least two flat cables are surrounded by said first and second member until extending therefrom at said cable exit, and said at least first and second members including peripheral portions of said forward portions associated with peripheral portions of said rearward shell face surrounding said flat cables extending therefrom and adapted to fit thereagainst upon said first and second members being secured to said rearward shell face; and

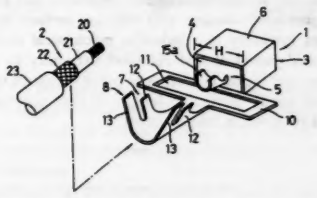
said strain relief assembly having a support section at said cable exit and including means for clamping said flat cables to said support section to protect said terminations of said terminal means to respective said flat cables from stress otherwise transmittable thereto by said flat cables,

whereby said strain relief assembly is adapted to be securable along said rearward shell face behind rearward ends of said housed terminations after said terminations have been housed within said shell member and surround said plurality of flat cables extending from said rearward shell face, and be clamped to said flat cables, and said strain relief assembly defining a covering for said rearward shell face enabling said rearward shell face to include a plurality of openings for insertion of respective said terminated cable ends thereinto to be housed.

5,073,128
MINIATURE ELECTRICAL CONTACT TERMINAL

Akira Sirai; Mitsuyosi Yamamoto, and Haruo Kurosawa, all of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Jun. 14, 1991, Ser. No. 715,386
Claims priority, application Japan, Aug. 30, 1990, 2-90022[U]
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—585 3 Claims



1. A miniature electrical contact terminal comprising:

a shield jacket including a contact support section, a flat section with a tool opening, a shield braid crimping section, and an outer sheath crimping section;

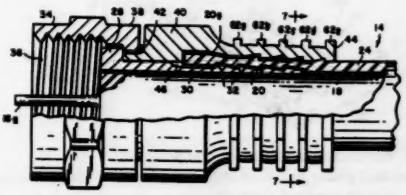
an insulator block fitted in said contact support section; and

a signal line contact fitted in said insulator block such that a pair of signal line crimping tabs are placed above said tool opening.

5,073,129
COAXIAL CABLE END CONNECTOR

Andrew Szegda, Canastota, N.Y., assignor to John Mezzalingua Assoc. Inc., Manlius, N.Y.

Division of Ser. No. 364,303, Jun. 12, 1989, Pat. No. 4,490,106.
This application Jan. 30, 1991, Ser. No. 647,837
Int. Cl.[5] H01R *17/18*
U.S. Cl. 439—585 14 Claims



1. An end connector for connecting a coaxial cable to a port, said cable being of the type having an electrical inner conductor surrounded by and spaced inwardly from an electrical outer conductor, with a dielectric insulator interposed between said inner and outer conductors, and with a dielectric jacket surrounding the outer conductor, said end connector comprising:

a tubular post having a front end and a rear end, with a cylindrical first sleeve opening towards said rear end;

fastener means at the front end of said post for attaching said connector to said port; and

a tubular body supported at the front end of said post at a location adjacent to said fastener means, said body having a cylindrical second sleeve surrounding and spaced radially from said first sleeve to define an annular chamber therebetween, said second sleeve having an open rear end leading to said annular chamber, said second sleeve having an interior surface and having grooves in its exterior surface defining a plurality of axially spaced circular ribs,

with the rearmost of said ribs located at the rearmost extremity of said tubular body and surrounding said open end,

said first sleeve being adapted for insertion into a position in an end of said cable at which said second sleeve is in electrical contact with said outer conductor and electrically isolated from said inner conductor by said dielectric insulator, with said jacket being received in said chamber and being surrounded by said second sleeve,

at least some of said ribs including said rearmost rib being deformable into hexagonal configurations and having diameters greater than f/0.866 where "f" is the distance between any two opposed flats of said hexagonal configuration, the deformation of said ribs into said hexagonal configurations causing said interior surface to be deformed inwardly into indented mechanical engagement with said jacket at said rearmost extremity to sealingly engage said jacket as well as at other locations which are spaced axially along the length of that portion of said jacket received in said chamber.

5,073,130

ELECTRICAL CONNECTOR

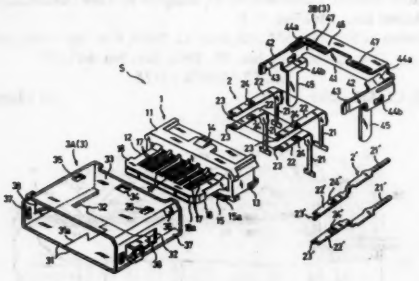
Masahiko Nakamura, Kitakatsuragigun, Japan, assignor to Hosiden Corporation, Yao, Japan

Filed Nov. 29, 1990, Ser. No. 619,414

Claims priority, application Japan, Dec. 4, 1989, 1-141019[U]

Int. Cl.[5] H01R *13/648*

U.S. Cl. 439—607 **5 Claims**



1. An electrical connector comprising:

contact pieces provided at the tips thereof with contacts and having terminal portions;

a connector body having (i) a main body which houses parts of said terminal portions of said contact pieces and (ii) a contact piece holding member projecting from said main body for holding said tips of said contact pieces at which said contacts are formed;

a casing shield frame unit surrounding the entire periphery of said contact piece holding member;

arms having one end secured to lateral wall portions of said shield frame unit which are opposite to lateral surfaces of said contact piece holding member, said one end being electrically connected to said shield frame unit; and

contacts formed at the free ends of said arms and adapted to come in contact with or separated from the outside surfaces of lateral walls of the shield frame unit of a counter electrical connector which are inserted in or removed from the spaces formed between said casing shield frame unit and said contact piece holding member of said connector body.

5,073,131

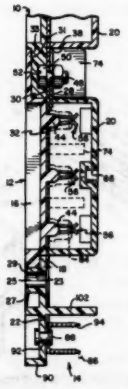
FUSE HOLDER

Mark Levine, Plainview, N.Y., assignor to General Automotive Specialty Co., Inc., North Brunswick, N.J.

Filed Jan. 28, 1991, Ser. No. 646,874

Int. Cl.[5] H01R *13/68, 33/94*

U.S. Cl. 439—621 **23 Claims**



1. A fuse holder adapted to be coupled to another fuse holder of like structure, comprising:

an insulating base;

an electrically conductive element mounted on said base;

contact means including first contacts in electrical connection with said conductive element and second contacts which are electrically isolated from said first contacts and from said conductive element, said first and second contacts being arranged in pairs adapted for holding the fuse terminals of fuse elements; and

releasable engaging means for releasably locking together said base with another like base and for simultaneously electrically connecting said conductive element with another conductive like element located on said other base as said bases are releasably locked together.

5,073,132

FLAT CONTACT SPRING FOR PLUGS OF ELECTRICAL PLUG AND SOCKET CONNECTIONS

Rudolf Nottrott, Nuremberg, Fed. Rep. of Germany, assignor to TRW Daut & Rietz GmbH & Co. KG, Nuremberg, Fed. Rep. of Germany

PCT No. PCT/EP90/00256, § 371 Date Nov. 16, 1990, § 102(e) Date Nov. 16, 1990, PCT Pub. No. WO90/10322, PCT Pub. Date Sep. 7, 1990

PCT Filed Feb. 16, 1990, Ser. No. 613,485

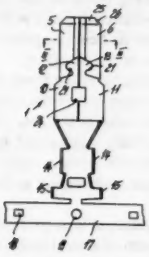
Claims priority, application Fed. Rep. of Germany, Feb. 28, 1989, 3906207

Int. Cl.[5] H01R *13/04, 13/02*

U.S. Cl. 439—884 **7 Claims**

1. A flat contact spring for plugs of electrical plug and socket connections, which has crimped projections for connecting electrical wires as well as a recess which supports a holder tongue attached to the spring housing with its border surfaces, characterized by a sheet metal blank with a first segment (**3**) having a center strip (**4**) and a longitudinal strips (**5, 6**) which can be folded up onto this center strip is provided, the longitudinal border strips (**5, 6**) of which have cut-outs (**7, 7'**) which connect with the border edges, which together form a recess provided with undercuts when the longitudinal border strips (**5, 6**) are folded onto the center strip (**4**), and a second segment (**8**) with a center strip (**9**) and longitudinal border strips (**10, 11**) which can be folded up onto this center strip is provided, the longitudinal border strips having hook-shaped

notches (12, 13), which engage with the recess of the longitudinal border strips of the first segment (3) when the longitudinal



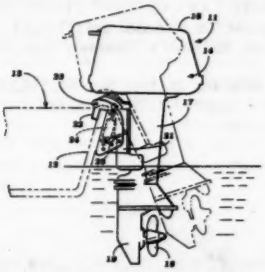
border strips (5, 6) are folded onto the center strip (4), jointly creating a positive lock for holding the longitudinal border strips (5, 6, 10, 11) of the first and second segment in place.

5,073,133

FUEL SUPPLYING SYSTEM FOR ENGINE OF OUTBOARD MOTOR

Seiji Inoue, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 25, 1990, Ser. No. 514,502
Claims priority, application Japan, Apr. 25, 1989, 1-105426
Int. Cl.[5] B63H *21/22*
U.S. Cl. 440—1 **17 Claims**



1. In an engine control for an outboard motor including an engine and adapted to be mounted for trim adjustment of the position of the outboard motor, said engine having a manual control for operator adjustment of the speed of said engine, and a fuel system controlled by said manual control, the improvement comprising means for sensing the trim condition of the outboard motor and means for adjusting the fuel system of the engine in response to the sensed trim condition to maintain normal running even when the trim condition is changed.

5,073,134

BOAT DRIVE WITH ADJUSTABLE PITCH PROPELLER

Peter Müller, Isengrund 9, CH-8134 Adliswil, and Urs Morgenthaler, Seeblick, CH-8832 Wollerau, both of Switzerland

Filed Dec. 28, 1990, Ser. No. 635,739
Claims priority, application Fed. Rep. of Germany, Jan. 4, 1990, 4000115
Int. Cl.[5] B63H *3/08*
U.S. Cl. 440—50 **16 Claims**

1. A boat drive, comprising:

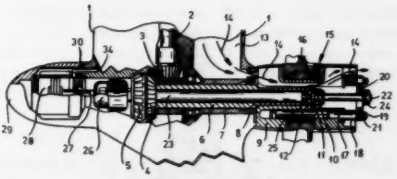
a drive housing projecting from a hull of a boat;

a hollow propeller shaft journaled in said housing;

means in said housing for rotating said propeller shaft;

a propeller hub mounted on said propeller shaft and provided with a plurality of adjustable-pitch propeller blades, and respective blade-adjustment stems extending parallel to said propeller shaft and shiftable in an axial direction to adjust a pitch of said blades, said hub having an end turned toward said housing and a free end turned away from said housing;

a pitch-adjustment push rod passing through said propeller shaft, projecting out of said hub with one extremity of said push rod at said free end of said hub and axially shiftable in said propeller shaft;



means for releasably connecting said one extremity to said blade-adjustment stems for varying the pitch of said blades upon axial displacement of said push rod, said push rod extending at an opposite extremity out of said propeller shaft; and

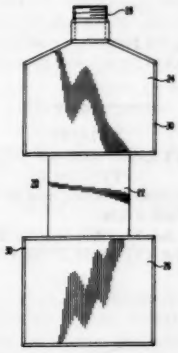
a double-acting piston-and-cylinder unit in said housing connected to said opposite extremity of said push rod for axially displacing same.

5,073,135

BUOYANT MARKER

Raymond Parks, Rte. 1, Box 85, Porter, Okla. 74454

Filed Sep. 17, 1990, Ser. No. 583,338
Int. Cl.[5] B63B *21/52*
U.S. Cl. 441—6 **7 Claims**



1. A combination liquid container and air filled buoyant marker device, comprising:

a medial portion for receiving a line;

two enlarged opposite rectangular end portions on either side of said medial portion, said medial portion and said two enlarged opposite end portions defining a continuous, completely hollow interior for containing liquid, means including a neck and opening and being formed on the device for filling and emptying the device of liquid or air, wherein said opening is spaced by the neck from the device to facilitate pouring,

wherein, when the device is filled with liquid, it serves as the fluid container, and

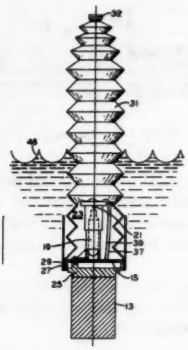
wherein, when the device is filled with air, it serves as the buoyant marker.

5,073,136

COLLAPSIBLE SONOBUOY FLOATATION DEVICE

Paul H. DeWitt; James J. Majewski, and Thomas A. Richter, all of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Mar. 29, 1990, Ser. No. 501,051
Int. Cl.[5] B63B *22/08*
U.S. Cl. 441—7 **8 Claims**



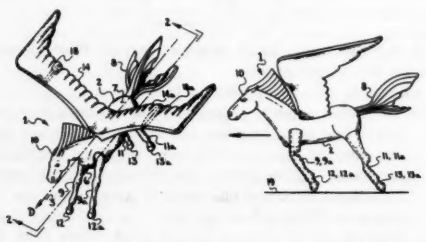
1. A surface unit for a buoy comprising a variable volume sealed chamber formed of a semi-rigid plastic cup having a corrugated sidewall portion and a closed end portion, and a rigid base member sealed to the cup sidewall portion forming in conjunction therewith the variable volume sealed chamber, the variable volume sealed chamber having a relatively constant surface area, and means within the sealed chamber and operable when energized for increasing the chamber volume from a collapsed volume to an expanded volume which is significantly greater than the collapsed volume, wherein the natural resilience of the sidewall portion tends to maintain the chamber at a volume intermediate the expanded volume and the collapsed volume, the surface unit further comprising means for reducing the pressure within the chamber whereby the natural resilience of the sidewall portion reduces the chamber volume.

5,073,137

TOY FOAM PLASTIC GLIDER WITH FLEXIBLE APPENDAGES

Jack V. Miller, and Ruth E. Miller, both of 700 N. Auburn Ave., Sierra Madre, Calif. 91024

Filed Jul. 12, 1990, Ser. No. 551,280
Int. Cl.[5] A63H *27/00, 3/04*
U.S. Cl. 446—61 **5 Claims**



1. A molded plastic foam toy glider in the form of an animal figure comprising:

an elongated fuselage generally symmetrical about a vertical plane, having a longitudinal axis, generally parallel sides, a front end and a rear end, when said toy glider is in a normal horizontal flight orientation, the fuselage being generally in the form of an animal torso;

a pair of wings in the form of animal wings, attached to the fuselage and having portions comprising a generally planar airfoil cross-sectional shape with a mean aerodynamic chord of the airfoils being approximately parallel to the longitudinal axis of the fuselage;

a nose section generally in the form of an animal head and attached to the front end of the fuselage;

a tail section empennage at the rear end of the fuselage;

one or more generally cylindrical male appendage studs extending a distance from a surface of the glider, and canted at an angle with respect to the vertical plane of the fuselage;

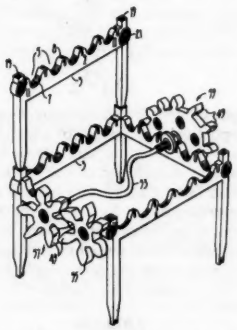
one or more elongated, at least partially hollow, appendages in the general form of animal limbs, each having an elastomeric and hollow recess configured to match the size and shape of a respective appendage stud, each said appendage having a substantial portion thereof at an obtuse angle with respect to the respective recess and extending from the surface of the glider a greater distance than the length of said respective appendage stud, whereby rotation of an appendage about its respective stud causes a change in the angle of the appendage with respect to the vertical plane of the fuselage.

5,073,138

MODULAR GEAR AND FRAME TOY

Daniel B. Klitsner, San Francisco, and D'Miles E. Milsal, Sunol, both of Calif., assignors to Discovery Toys, Inc., Martinez, Calif.

Filed Jun. 29, 1990, Ser. No. 546,293
Int. Cl.[5] A63H *33/08, 33/12*
U.S. Cl. 446—103 **22 Claims**



1. A modular toy allowing easy assembly for children comprising:

a frame having a plurality of slots spaced substantially equally apart, said slots having resilient fastening means;

a bridge having extensions able to removably connect said bridge to said frame so that said bridge is substantially perpendicular to said frame;

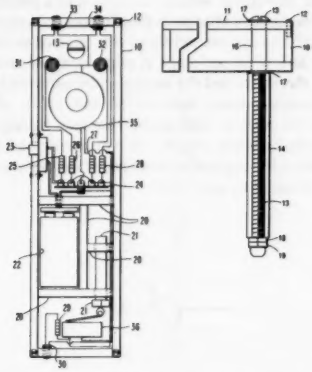
a rotary movement hub assembly modularly and removably mounting within said resilient fastening means in said slots, so that said modular toy may be configured with minimal effort by children in a fashion that allows rotary movement of a first part attached to said hub assembly to effect rotary movement of a plurality of parts in the same plane and at least one plane parallel to a plane of the first part.

5,073,139

NOISE-MAKER

Jacob Kassarich, 63 Academy Rd., Bala-Cynwyd, Pa. 19004

Filed Jun. 14, 1990, Ser. No. 538,078
Int. Cl.[5] A63H *5/00*
U.S. Cl. 446—242 3 Claims



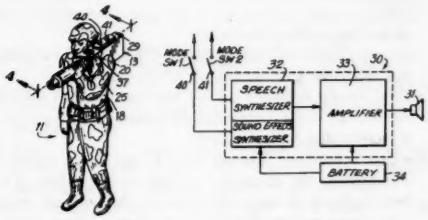
1. A rotatable, electronic noise-maker comprising a container housing light-emitting means, noise producing means actuated by a centrifugal force switch and electronic circuitry, said container being rotatably attached to an approximately perpendicular handle, and comprising translucent, substantially rectangular front and rear wall members attached to substantially rectangular top and bottom wall members and two end wall members, said container internally compartmentalized with translucent partition plates separating the centrifugal force actuated switch from the electronic circuitry and a power source means from both the electronic circuitry and said centrifugal force activated switch, said partition plates providing at least one aperture for passage of circuitry between said compartments.

5,073,140

TOY ACTION FIGURES AND SPEECH AND SOUND EFFECTS ACCESSORY THEREFOR

Steven Lebensfeld, 805 Pond La., Woodsburgh, N.Y. 11598; Harvey Goldberg, 8 Northbank Ct., Thornhill, Ontario, Canada L3T 7J7 ; David C. K. Kwan, Block A & B, 3/F., CDW Bldg., 382-392 Castle Peak Road, and Ma H. Wai, Unit 7, 10/F., Wah Chun Industrial Bldg., 54-58 Tai Chung Road, both of Tsuen Wan, N.T., Hong Kong, assignors to Steven Lebensfeld, Woodsburgh, N.Y.; Harvey Goldberg, Thornhill, Canada; David C. K. Kwan and Ma H. Wai, both of Tsuen Wan, Hong Kong

Filed Oct. 22, 1990, Ser. No. 602,150
Int. Cl.[5] A63H *5/04, 3/28*
U.S. Cl. 446—297 38 Claims



1. A toy comprising, in combination:

at least one toy action figure having a given configuration and visual appearance; and

at least one accessory having a configuration and visual appearance which is coordinated with the configuration and visual appearance of said toy action figure;

said toy action figure and said accessory having cooperating means for removably attaching said accessory to said toy action figure;

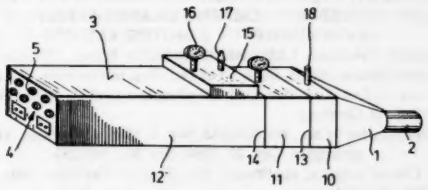
said accessory including audio generating apparatus for generating speech and sound effects, said audio generating apparatus comprising at least one selectively actuable control for causing said audio generating apparatus to generate said speech and sound effects, said generating apparatus being carried entirely by said accessory.

5,073,141

ACCESSORY DEVICE FOR A SAUSAGE STUFFER

Josef Lemmer, Sorrento, Canada, assignor to H. Maurer & Sohne Rauch-Und Warmetechnik, Fed. Rep. of Germany

PCT No. PCT/EP88/00716, § 371 Date Mar. 26, 1990, § 102(e) Date Mar. 26, 1990, PCT Pub. No. WO89/01290, PCT Pub. Date Feb. 23, 1989
PCT Filed Aug. 10, 1988, Ser. No. 458,722
Int. Cl.[5] A22C *11/00*
U.S. Cl. 452—30 10 Claims



1. Accessory device for a sausage stuffer for the production of skinless sausage, or the like, said sausage stuffer having a fitting pipe, said accessory device comprising:

elongated pipe arrangement means for continuous feeding of sausage mass therethrough, said elongated pipe arrangement means including a plurality of parallel pipes and widening connection pipe means for being connected to the fitting pipe of the sausage stuffer;

a first and a second heating station disposed adjacent one another along said elongated pipe arrangement; and

a cooling station disposed along said elongated pipe arrangement adjacent said first heating station on a side thereof upstream of the sausage mass flow through the elongated pipe arrangement.

5,073,142

METHOD AND APPARATUS FOR SUSPENDING CASING PRODUCTS FILLED WITH MATERIAL

Minoru Kasai, Ebina, and Minoru Nakamura, Tokyo, both of Japan, assignors to Hitec Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,209
Claims priority, application Japan, Apr. 22, 1989, 1-103106; Feb. 16, 1990, 2-33668
Int. Cl.[5] B65G *37/00*
U.S. Cl. 452—51 18 Claims

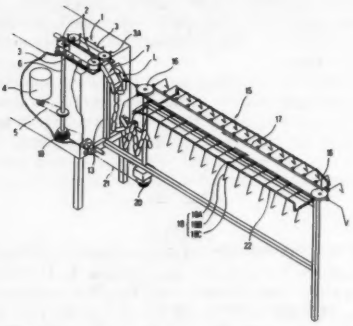
1. A method for suspending a product with a material filled in a casing, by means of a plurality of retaining members which are moving, comprising the steps of:

supplying said product in a longitudinal direction thereof;

causing said retaining members to move toward a path of said product in such a manner that a plane of movement of said retaining members at a position of intersection with the path of said product includes a horizontal component; and

causing each of said retaining members sequentially and a

hampering member located forwardly of the path of said product in a moving direction of said retaining members to coast in applying a braking force to said product in such a manner that a portion of said product located upstream of a



portion where said product engages with each of said retaining members.

5,073,143

APPARATUS FOR TRANSMITTING TORQUE BETWEEN THE ENGINE AND THE CHANGE SPEED TRANSMISSION OF A MOTOR VEHICLE

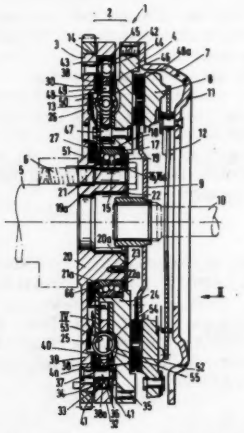
Oswald Friedman, Lichtenau; Hans-Dieter Elison, Offenburg, and Johann Jäckel, Bühl, all of Fed. Rep. of Germany, assignors to Luk Lamellen Und Kupplungbau GmbH, Bühl, Fed. Rep. of Germany

Continuation of Ser. No. 904,683, Sep. 5, 1986, abandoned. This application Oct. 22, 1990, Ser. No. 600,255

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531984

Int. Cl.[5] F16D *3/12, 3/14*

U.S. Cl. 464—68 **71 Claims**



1. Apparatus for damping torsional vibrations in the power train between the engine and the transmission of a motor vehicle, comprising a composite flywheel including a first flywheel connectable to the engine and a second flywheel arranged to transmit torque to the transmission, said first and second flywheels being coaxial with and being rotatable relative to each other clockwise and counterclockwise; and torque-transmitting damper means operative to oppose angular movements of said first and second flywheels relative to each other from a neutral position, said damper means including a first damper having means for opposing at least one stage of said angular movements with an increasing force, a second damper operating in series with said first damper and having means for opposing at least one range of said angular movements with an increasing force when the magnitude of torgue which one of said first and second flywheels transmits to the other of said first and second flywheels reaches a preselected value, and a third damper including a friction generating device which opposes said angular movement with the exception of a predetermined angle following each change of the direction of angular movement of said first and second flywheels relative to each other, said range following said stage in said clockwise and counterclockwise directions and the maximum torque which said first damper transmits being between 80 and 130% of nominal torque of the engine, said second damper having a spring characteristic between 30 and 150 Nm during clockwise and counterclockwise angular movements of said first and second flywheels relative to each other.

5,073,144

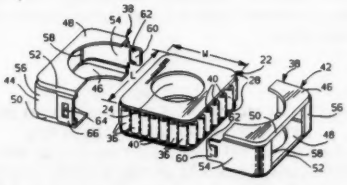
DRIVE ASSEMBLY FOR UNIVERSAL JOINT

Paul R. Stenglein; Robert C. Farrell, both of Frankenmuth, and Michael A. Derry, Alma, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 371,148, Jun. 26, 1989, abandoned. This application Jul. 3, 1990, Ser. No. 547,421

Int. Cl.[5] F16D *3/30*

U.S. Cl. 464—111 **16 Claims**



1. A drive assembly for a universal joint having an inner drive member which has a plurality of radial trunnions and an outer drive member which has a plurality of longitudinal channels, the drive assembly comprising:

a bearing block which is adapted to be mounted on a radial trunnion on the universal joint and which has a continuous roller track which includes two straight raceways which are on opposite driving sides of the bearing block which face respective opposite longitudinal sides of a longitudinal channel when the bearing block is mounted on the radial trunnion and the drive assembly is disposed in one of the longitudinal channels,

a full complement of bearing rollers disposed on the continuous roller track of the bearing block, and

a cage fixedly mounted on the bearing block so that the rollers roll on the continuous roller track in the manner of a recirculating roller bearing,

the cage comprising first and second cage pieces which are mounted on the respective opposite driving sides of the bearing block so that a single one of the first and second cage pieces retains all of bearing rollers on the respective straight raceways for each driving side.

5,073,145

JOINT MOVABLE IN ALL DIRECTIONS, ESPECIALLY FOR LINKAGES AND CARDAN SHAFTS

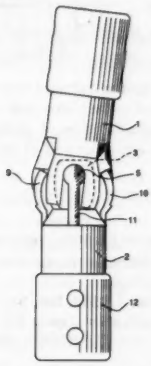
Elke Ratzokwski, Bad Essen, and Keit Wagener, Bissendorf, both of Fed. Rep. of Germany, assignors to Lemförder Metallwaren AG, Lemförde, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 456,980

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843825

Int. Cl.[5] F16D *3/18*

U.S. Cl. 464—157 **5 Claims**



1. A joint movable in all directions for linkages and Cardan shafts, comprising a two part joint including a first joint part; and a second joint part, each of said first and second joint parts being formed substantially integral of an elastically deformable plastic, said first joint part including coupling members which are substantially identical to coupling members of said second joint part, said first joint part being oriented 90° with respect to said second joint part and being fitted into said second joint part by elastic deformation of said coupling members said joint allowing relative deflection of elements connected to said first and second joint parts in an entire rotational range of 360°, said coupling members of each of said first and second joint parts include a forked structure with link pins, each link pin arranged co-axially with respect to the other on an outside portion of two fork arms forming said forked structure, said forked structure including fork members defining a slot open at a free end of the joint for receiving a link pin of the other joint, said fork arms having an outer surface which is substantially spherical and said fork members having a spherical contour, said fork members defining a continuation of said slot and engaging the outer spherical surface of the fork arms of the other joint part.

5,073,146

COMPRESSOR VALVING

Norman G. Beck, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Apr. 5, 1990, Ser. No. 504,875

Int. Cl.[5] F04B *39/10*

U.S. Cl. 417—571 **23 Claims**

1. A refrigeration compressor comprising:

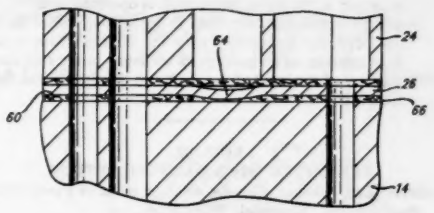
a cylinder block defining a compression chamber;

a valve plate overlying said compression chamber and including suction valve means and discharge valve means for controlling fluid flow to and from said compression chamber;

a head secured to said cylinder block and clamping said valve plate therebetween, said head including means defining a suction chamber and discharge chamber;

gasket means clamped between said valve plate and said head for creating a sealing relationship therebetween;

and means on said valve plate for increasing the clamping force exerted on said gasket means in a predetermined area to thereby insure a fluid tight seal therebetween, said



predetermined area being positioned in overlying relationship to said compression chamber.

5,073,147

BELT-TYPE CONTINUOUSLY VARIABLE TRANSMISSION WITH VARIABLE-SPEED PULLEY MECHANISM

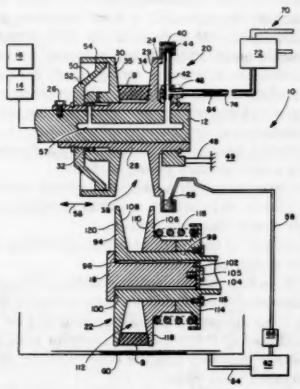
Hiroshi Takano, Miki; Takashi Masuda; Tomizo Kanaoka, both of Hyogo; Hideyuki Akao, Shiga; Katsuyuki Hioki, Hyogo, and Toshiaki Aragane, Takatsuki, all of Japan, assignors to Mitsuboshi Belting, Ltd., Japan

Filed Mar. 3, 1990, Ser. No. 502,299

Claims priority, application Japan, Mar. 30, 1989, 63-80698; Jun. 14, 1989, 1-153208

Int. Cl.[5] F16H *11/06*

U.S. Cl. 474—28 **34 Claims**



1. A belt-type continuously variable transmission comprising:

an input/drive shaft with a rotational axis;

an output/driven shaft with a rotational axis;

a first variable speed pulley on the input/drive shaft and having a first pulley part fixed against axial movement relative to the input/drive shaft and a second pulley part movable axially relative to the first pulley part, said first and second pulley parts having facing surfaces cooperatively defining a belt-receiving groove;

a second variable speed pulley on the output/driven shaft and having a third pulley part fixed against axial movement relative to the output/driven shaft and a fourth pulley part movable axially relative to the third pulley part, said third and fourth pulley parts having facing surfaces cooperatively defining a belt-receiving groove;

a fluid cylinder;

means for shifting the second pulley part axially relative to the first pulley part in response to a change in pressure in the fluid cylinder;

a fluid reservoir on the first variable speed pulley for rotation with the input/drive shaft;

means for sensing the rotational speed of the fluid in the fluid reservoir as the input/drive shaft is operated; and

means for communicating fluid in the sensing means to the fluid cylinder to thereby vary the fluid pressure in the fluid cylinder as an incident of a change in the rotational velocity of the input/drive shaft and the fluid in the fluid reservoir.

5,073,148

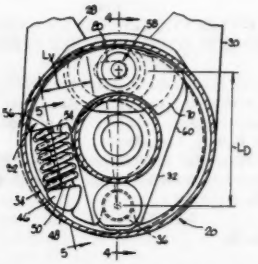
TENSIONER WITH DAMPING SYSTEM

Andrzej Dec, Windsor, Canada, assignor to Gates Power Drive Products, Inc., Bloomfield Hills, Mich.

Filed Dec. 20, 1990, Ser. No. 630,592

Int. Cl.[5] F16H *55/14*

U.S. Cl. 474—94 **6 Claims**



1. In a tensioner for tensioning a flexible power transmission member and of the type with a base structure; a pivot arm pivotably mounted with a pivot to the base structure; pulley means rotatably mounted to the base structure for engaging the power transmission member; a spring means between the base structure and pivot arm for biasing the position of the pivot arm; and means for damping movement of the pivot arm, the improvement comprising:

the pivot arm having a lever arm with a damping portion having a substantially planer surface;

the base structure with a damping portion with a substantially planer surface with a slotted aperature juxtaposed the pivot arm damping portion;

a pin attached to the pivot arm and extending through the slotted aperture;

a layer of friction material interpositioned between the pivot arm damping portion and the base damping portion;

a compression spring positioned around and retained by the pin and biasing the pivot arm damping portion, the layer of friction material, and the base structure damping portion against each other.

5,073,149

DIAPHRAGM SEAL TYPE TENSIONER

Masao Maruyama; Nobuto Kozakura, both of Hanno; Katsuya Nakakubo, Tokorozawa, and Nobuo Okamoto, Muko, all of Japan, assignors to Tsubakimoto Chain Co., Osaka, Japan

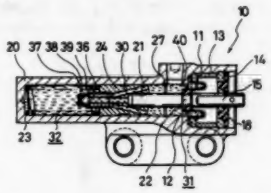
Filed Dec. 13, 1990, Ser. No. 626,734

Claims priority, application Japan, Dec. 14, 1989, 1-143582[U]

Int. Cl.[5] F16H *7/22*

U.S. Cl. 474—104 **17 Claims**

1. A diaphragm seal type tensioner including a cylinder having an inner wall and containing a hydraulic fluid, a piston arranged to slide in said cylinder, said piston partitioning the cylinder into a front chamber and a rear chamber, a piston rod fixed to said piston and extending therefrom, through said front chamber to the exterior of the cylinder, spring means for imparting an advancing force to said piston rod, means providing a restricted hydraulic fluid passage for permitting fluid communicating between said front chamber and said rear chamber, check valve means provided in said hydraulic fluid passage for permitting flow of the hydraulic fluid from said front chamber to said rear chamber, and a diaphragm, having inner and outer ends, for sealing said front chamber, the outer end of the diaphragm being fixed to the cylinder and the inner end of the diaphragm being fixed to the piston rod, wherein the improvement comprises a radially oriented circumferential groove in said piston rod, with the inner end of said diaphragm fitted in said groove.



5,073,150

CHAIN TENSIONER

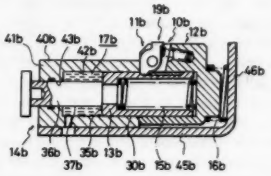
Kazuhiko Shimaya, Saitama, Japan, assignor to Tsubakimoto Chain Co., Osaka, Japan

Filed Jul. 9, 1990, Ser. No. 550,254

Claims priority, application Japan, Jul. 10, 1989, 1-80048[U]

Int. Cl.[5] F16H *7/08*

U.S. Cl. 474—110 **8 Claims**



1. A chain tensioner comprising: a tensioner assembly having a floating housing, a plunger received in said housing in the protruding direction, a first spring arranged between said floating housing and said plunger so as to impart a protruding force to said plunger and a ratchet mechanism for preventing said plunger from retreating; a second spring for urging said assembly in the protruding direction; and a fixed housing formed with an oil chamber in cooperation with said plunger so as to apply an external hydraulic pressure on said plunger in the direction opposite to said protruding direction; whereby the amount of protrusion of said floating housing by means of the second spring is limited.

5,073,151

MULTI-SPEED SPROCKET ASSEMBLY FOR BICYCLE

Masashi Nagano, Osaka, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan

Filed Oct. 30, 1989, Ser. No. 428,777

Claims priority, application Japan, Nov. 7, 1988, 63-281064

Int. Cl.[5] F16H *55/30*

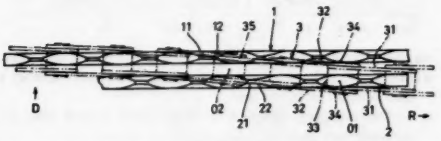
U.S. Cl. 474—160 **10 Claims**

1. A multi-speed sprocket assembly for a bicycle having at least one large sprocket with teeth and one small sprocket with teeth disposed adjacent each other and selectively engageable with a drive chain of the bicycle comprising a looped series of pivotably connected link plates, said sprocket assembly comprising:

a chain lifting-receiving portion formed on a reference tooth of the teeth of the large sprocket so as to lift to receive a

connecting portion of the link plates with diametrical clearance from a tooth bottom of the large sprocket;

the teeth of said small sprocket being arranged with such phase relationship relative to said chain lifting-receiving portion of the reference tooth of the large sprocket such that a tooth of said small sprocket positioned downstream in a rotational drive direction relative to said reference tooth engages with the chain when said connecting portion of the chain is received by said chain lifting-receiving portion of the reference tooth of the large sprocket;



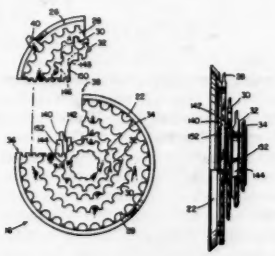
a cutout portion for preventing interference between said link plates and said small sprocket, said cutout portion being provided on a tooth of said small sprocket positioned within a path of the link plates of a chain portion positioned more upstream relative to said rotational drive direction than a further chain portion currently engaging with said small sprocket when said upstream chain portion moves to said chain lifting-receiving portion.

5,073,152

BICYCLE TRANSMISSION

Bruce W. Browning, Seattle, Wash., assignor to Browning Automatic Transmission, Bainbridge Island, Wash.

Filed Sep. 24, 1990, Ser. No. 587,401
Int. Cl.[5] F16H *55/30*
U.S. Cl. 474—162 **5 Claims**



1. A bicycle transmission, comprising:

a sprocket assembly coupled to an axle of a bicycle wheel for holding a chain, the sprocket assembly comprising a stationary sector coupled to the axle, the stationary sector having a plurality of sprockets and defining a generally V-shaped, open area, the V-shaped area being defined by a hinged side and a parting side of the stationary sector;

a plurality of flanges extending outwardly of the stationary sector within the V-shaped area, each flange having a load bearing surface that lies in a plane corresponding to a sprocket of the stationary sector; and

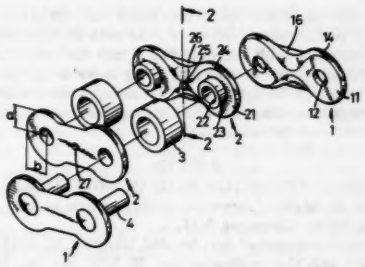
a swinging sector hingedly coupled to the stationary sector at the hinged side of the V-shaped area, the swinging sector having a plurality of engagement faces corresponding to the load bearing surfaces, the engagement faces imparting the load transmitted to the swinging sector by the chain to the load bearing surfaces.

5,073,153

CHAIN

Chia L. Wu, No. 734, Chung Shan Rd., Kuei Ren Hsiang, Tainan Hsien, Taiwan

Continuation-in-part of Ser. No. 637,293, Jan. 3, 1991. This application Mar. 19, 1991, Ser. No. 671,359
Int. Cl.[5] F16G *13/00*
U.S. Cl. 474—206 **3 Claims**



1. A chain comprising a plurality of pairs of inner and outer chain plates linked by rollers and pins, wherein the improvement comprises:

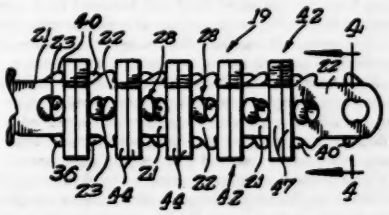
each said inner chain plate having a projection on an innermost central portion thereof to define a width between two inner chain plates slightly larger than thickness of a tooth of a sprocket.

5,073,154

CHAIN-BELT

John S. Ivey, Ithaca; Paul M. Bateman, Freeville; Julius A. Clauss; Edward H. Cole, Jr., both of Ithaca, and Philip J. Mott, Dryden, all of N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 416,704, Oct. 3, 1989, Pat. No. 5,009,631, which is a division of Ser. No. 356,617, May 23, 1989, Pat. No. 4,911,682, which is a continuation of Ser. No. 114,335, Oct. 28, 1987, abandoned. This application Jun. 1, 1990, Ser. No. 532,201
Int. Cl.[5] F16G *13/02*
U.S. Cl. 474—213 **21 Claims**



1. A rocker joint for a power transmission chain constructed of an assembly of links and pivot members,

the chain comprising a plurality of sets of links interleaved with other sets of links,

each link having ends and a central body portion and a pair of generally round and spaced openings, each of said openings having a wall defined by a pair of arcs separated by spaced and generally inwardly extending portions,

said inwardly extending portions being spaced such that one of the arcs is smaller than the other arc,

said pivot members comprising a pair of pins having substantially identical cross-sectional shapes with front convex surfaces engaging and rocking on one another,

each pin of a pair of pins having the front surface defined by a first radius, and a convex back surface defined by a

second radius matching that of said smaller arc of said opening, said first radius being larger than said second radius,

one of said pins of a pair of pins being received in the openings of one set of links between a pair of the extending portions thereof such that its back surface engages the surface defined by said smaller arc, thereby preventing substantial rotation of said pin relative to the links of that set,

the other pin of said pair of pins being received in the openings of the interleaved set of links with the same relative relationship with said openings as said one set of links,

the back surfaces of said pins being movable in the other openings of the links as the front surfaces move relative to one another when the chain articulates about its joints.

5,073,155

BELT CONNECTOR WITH IMPROVED BITE

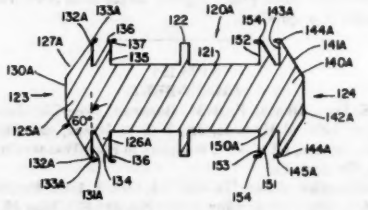
Norman H. Mabie, Claremont, N.H., assignor to L.M. & L. Corporation, Claremont, N.H.

Continuation-in-part of Ser. No. 443,731, Nov. 30, 1989, Pat. No. 5,017,182. This application Sep. 25, 1990, Ser. No. 587,683

The portion of the term of this patent subsequent to May 21, 2008, has been disclaimed.

Int. Cl.[5] F16G *7/00*

U.S. Cl. 474—256 **15 Claims**



1. An integral connector for joining recessed end portions of a flexible belt of resilient material thereby to form an endless belt assembly, said connector comprising an elongated, axially extending central body portion having a given transverse dimension and a plurality of axially spaced gripping head portions at each end of said central body portion, each said gripping head portion being rigid and bounded by a tapered surface and by a base planar surface with a transverse dimension that exceeds the transverse dimension of the recesses at the end portions of the belt and of said central body portion, said tapered and base planar surfaces extending toward an intersection about the periphery of said gripping head portion and having a continuous outlying roughened, feathered edge section flexibly supported by and integrally formed with said gripping head portion at said intersection, said tapered and base planar surfaces at adjacent gripping head portions defining different angles of intersection, said outlying roughened, feathered edge sections being flexible about said intersections to provide multiple, spaced engagements between said connector and the flexible belt at each recessed end portion.

5,073,156

NONSYNCHRONOUS AUTOMATIC TRANSMISSION WITH OVERDRIVE

Roy J. Garrett, Redford Township, Wayne County, Mich., and Alan R. Fisher, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 4, 1989, Ser. No. 445,880

Int. Cl.[5] F16H *57/10*

U.S. Cl. 475—56 **12 Claims**

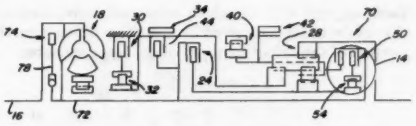
1. An automatic transmission comprising:

an input member;

a torque converter coupled to said input member;

a planetary gear set comprising a forward sun gear, a reverse sun gear, and an output member;

clutch means for selectively coupling said torque converter to said output member through each of a plurality of torque paths;



an overdrive brake engageable with said reverse sun gear;

a direct clutch for selectively coupling said input member to said output member; and

a one-way clutch coupled to said direct clutch and said forward sun gear.

5,073,157

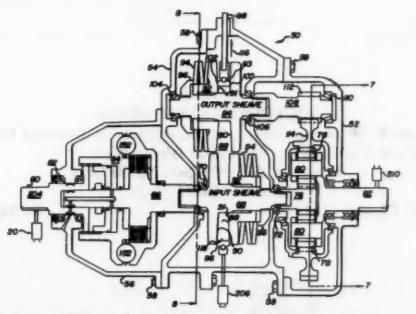
MECHANICALLY VARIABLE TRANSMISSION

Saul Herscovici, Waterloo, Iowa, assignor to Power Engineering & Manufacturing, Ltd., Waterloo, Iowa

Filed Feb. 20, 1990, Ser. No. 482,074

Int. Cl.[5] F16H *37/00*

U.S. Cl. 475—211 **55 Claims**



1. A mechanically variable transmission comprising:

(a) a first adjustable sheave having a first race formed by said first adjustable sheave of a size in part defined by a moveable hub axially disposed in a first direction;

(b) a second adjustable sheave having a second race formed by said second adjustable sheave of a size in part defined by a moveable hub axially disposed in a direction opposite to said moveable hub of said first adjustable sheave;

(c) a substantially circular power ring having substantially flat side faces for connecting said first race of said first adjustable sheave to said second race of said second adjustable sheave;

(d) means for radially positioning said substantially circular power ring in at least one race formed by said first adjustable sheave and said second adjustable sheave; and

(e) an output shaft operatively connected to said first adjustable sheave.

5,073,158

BELT OR CHAIN TENSIONER FOR POWER TRANSMITTING SYSTEM

Juji Ojima, Aikawa, Japan, assignor to NHK Spring Co., Ltd., Yokohama, Japan

Filed Aug. 1, 1990, Ser. No. 561,078

Claims priority, application Japan, Aug. 1, 1989, 1-199802

Int. Cl.[5] F16H *7/08*

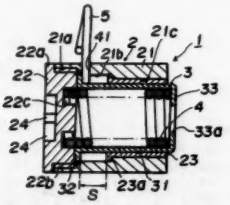
U.S. Cl. 474—138 **6 Claims**

1. A tensioner for tensioning a belt or chain by urging a

tension rod from a casing by means of a compression spring comprising:

a tube type casing slidably supporting a tension rod, said casing having a plurality of through holes formed therein, and a stopper pin insertable into said through hols so as to hold said tension rod at a predetermined urging position within the stroke of the tension rod;

a sleeve made of synthetic resin having a flange portion on a rear end thereof inserted in a small diameter portion of said casing;



a plug detachably screwed in the rear end of said casing for supporting a rear end of a compression spring for urging said tension rod;

a cup shaped tension rod having a head portion and a flange portion on a rear end thereof inserted slidably in said casing and supported by said plug; and

a compression spring mounted in said tension rod so as to urge said tension rod, the rear end of said compression spring being supported by said plug.

5,073,159

VEHICLE TRANSMISSION

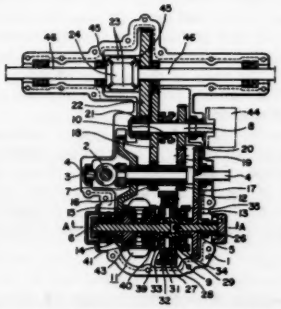
Nobuhide Kurachi, Maebashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1990, Ser. No. 516,776

Claims priority, application Japan, May 16, 1989, 1-120430

Int. Cl.[5] F16H *00/00*

U.S. Cl. 475—216 **23 Claims**



1. A vehicle transmission comprising a hollow casing; a first power transmitting shaft rotatably supported in said casing for receiving an input rotative driving force; a second power transmitting shaft rotatably supported in said casing in parallelism to said first power transmitting shaft; a first gear supported on the outer peripheral surface of said first power transmitting shaft against rotation relative to said first power transmitting shaft and meshing with a second gear first gear; supported on an outer peripheral surface of said second power transmitting shaft against rotation relative to said second power transmitting shaft; a toroidal type continuously variable transmission supported in said casing coaxially with said second power transmitting shaft; first clutch means provided between an input side disk of said toroidal type continuously variable transmission and said second power transmitting shaft; a third power transmitting shaft rotatably supported in said casing in parallelism to a center of rotation of an output side disk of said toroidal type continuously variable transmission; a third gear supported on said output side disk of said toroidal type continuously variable transmission against rotation relative to said output side disk and meshing with a fourth gear supported on an outer peripheral surface of said third power transmitting shaft against rotation relative to said third power transmitting shaft; fifth and sixth gear supported on the outer peripheral surface of said third power transmitting shaft against rotation relative to said third power transmitting shaft; a fourth power transmitting shaft rotatably supported in said casing in parallelism to said third power transmitting shaft; a seventh gear supported around said fourth power transmitting shaft for rotation relative to said fourth power transmitting shaft and meshing with said fifth gear; an eighth gear; a ninth gear supported around said fourth power transmitting shaft for rotation relative to said fourth power transmitted shaft and meshing with said sixth gear through said eighth gear; second clutch means provided between said fourth power transmitting shaft and said seventh and ninth gears for alternatively coupling said seventh and ninth gears with said fourth power transmitting shaft; and power taking-off means for taking out rotative driving force from said fourth power transmitting shaft.

5,073,160

PLANETARY GEAR TYPE MULTISTAGE TRANSMISSION

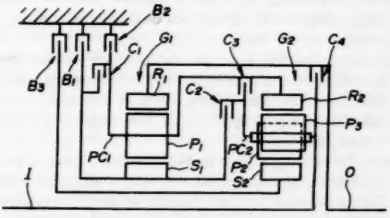
Toshikazu Oshidari, Kanagawa, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed May 10, 1991, Ser. No. 698,211

Claims priority, application Japan, May 14, 1990, 2-123785

Int. Cl.[5] F16H *57/10*

U.S. Cl. 475—281 **10 Claims**



1. A planetary gear type multistage transmission comprising:

a first planetary gearset including a first sun gear, a first internal gear, first pinion gears operatively meshed with said first sun gear and said first internal gear and a first pinion carrier rotatably carrying said first pinion gears;

a second planetary gearset including a second sun gear, a second internal gear, mutually engaged second and third pinion gears respectively meshed with said second sun gear and said second internal gear and a second pinion carrier rotatably carrying said second and third pinion gears, said second pinion carrier being selectively united with said first pinion carrier;

an input shaft having said second pinion carrier united therewith;

an output shaft having said first internal gear united therewith;

a first clutch for selectively engaging said first sun gear with said first pinion carrier;

a second clutch foı selectively engaging said first sun gear with said second pinion carrier;

a third clutch for selectively engaging said second pinion carrier with said second internal gear;

a first brake for selectively braking said first sun gear;

a second brake for selectively braking said first pinion carrier; and

a third brake for selectively braking said second sun gear.

5,073,161

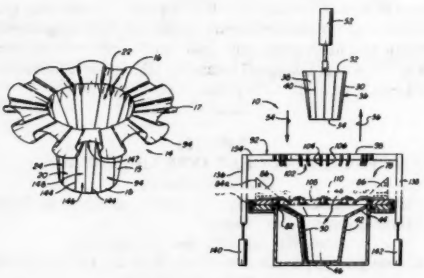
APPARAUS OF MAKING A FLOWER POT OR FLOWER POT COVER WITH CONTROLLED PLEATS

Donald E. Weder; Joseph G. Straeter, both of Highland, Ill., and Frank J. Craig, Valley Park, Mo., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 366,588, Jun. 15, 1989, abandoned, and a continuation-in-part of Ser. No. 397,114, Aug. 22, 1989, Pat. No. 5,029,412, and a continuation-in-part of Ser. No. 367,098, Jun. 15, 1989, Pat. No. 318,030, and a continuation-in-part of Ser. No. 219,083, Jun. 13, 1988, Pat. No. 4,897,031. This application Oct. 17, 1989, Ser. No. 422,653

Int. Cl.[5] B31D *5/04*

U.S. Cl. 493—154 14 Claims



1. An apparatus for forming a sheet of material into a flower pot or flower pot cover, comprising:

means for forming the sheet of material into the predetermined shape of the flower pot or flower pot cover, comprising:

a female die having an upper end, a lower end, an opening extending through the upper end and extending a distance into the female die forming a female die surface; and

a male die having an upper end, a lower end, and a male die surface; and

means for moving at least one of the male die and the female die from a storage position spaced a distance from the female die to a forming position wherein the male die is disposed in the opening in the female die and for moving at least one of the male die and the female die from the forming position to the storage position; and

means for forming pleats in the sheet of material whereby the flower pot or flower pot cover includes pleats on the flower pot or flower pot cover comprising at least one recessed area formed in the male die surface with the remaining portion of the male die surface forming at least one mating area, the mating areas on the male die being shaped to matingly engage adjacent portions of the female die surface when the male die is disposed in the female die and positioned therein in the forming position, the sheet of material being disposable between the male die and the female die and the sheet of material being positioned between the male die and the female die in the forming position whereby pleats are formed in the flower pot or flower pot cover, the portions of the sheet of material disposed between the mating areas on the male die and adjacent portions of the female die surface being overlapped to form overlapping folds, portions of the sheet of material disposed between the recessed areas of the male die and adjacent portions of the female die surface forming substantially non-sealed areas substantially without any overlapping folds, the portions without overlapping folds cooperating with the overlapping folds to form pleats.

5,073,162

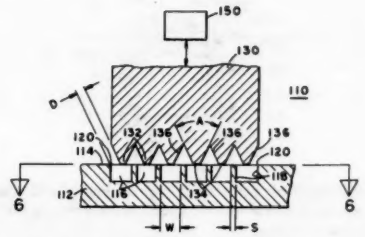
APPARATUS FOR FORMING CONTAINERS WITH ROUNDED EDGES

Christopher J. Campbell, Midlothian; Linda S. Latif, Richmond, both of Va., and Herman Graboyes, Norristown, Pa., assignors to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 547,562, Jul. 2, 1990, which is a division of Ser. No. 312,860, Feb. 21, 1989, Pat. No. 4,955,531. This application Aug. 28, 1990, Ser. No. 573,991

Int. Cl.[5] B31B *1/25*

U.S. Cl. 493—396 12 Claims



1. Apparatus for working on an initially flat workpiece of predetermined thickness to cause the workpiece to have a rounded edge when bent about a longitudinal edge axis comprising:

a counter plate having a surface for receiving one flat surface of said workpiece, said counter plate surface being substantially flat except for a plurality of longitudinal, substantially parallel, laterally spaced grooves, each of said grooves being substantially parallel to said longitudinal edge axis and having lateral side surfaces which are substantially perpendicular to said counter plate surface;

a punch having a plurality of longitudinal, substantially parallel, laterally spaced ridges, the number and lateral spacing of said ridges being equal to the number and lateral spacing of said grooves, and each of said ridges being aligned with a respective one of said grooves and having a substantially flat apex and side surfaces which are synclinal toward said apex, the spacing between the side surfaces of each groove being slightly greater than a distance equal to twice said predetermined thickness plus the width of the apex of the associated ridge, the spacing between at least one groove and an adjacent groove being less than said distance; and

means for moving said punch toward the counter plate surface so that the apex of each ridge contacts the other flat surface of said workpiece and forces the adjacent portion of the workpiece into the associated groove in order to produce one of a plurality of substantially parallel, laterally spaced score lines in said workpiece.

5,073,163

APPARATUS FOR TREATING GLAUCOMA

Myron E. Lippman, 824 Alston Rd., Santa Barbara, Calif. 93108

Filed Jan. 29, 1990, Ser. No. 471,779

Int. Cl.[5] A61M *5/00*

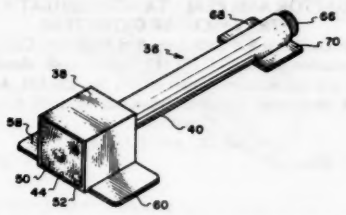
U.S. Cl. 604—9 9 Claims

1. An apparatus for treating glaucoma comprising:

a housing having a longitudinal center axis, said housing having a main section and a tubular extension, said tubular extension having an open outer end, said tubular extension connecting with said main section, said tubular extension being hollow defining a connecting chamber, said main section being hollow defining a main chamber, said connecting chamber connecting with said main chamber, said main chamber having an open aft end;

a rigid plastic block located within said housing, said rigid plastic block closely conforming in a fluid tight manner to said housing, said rigid plastic block having a plurality of

tiny through openings located in a parallel spaced-apart arrangement, each said through opening having a diameter no greater than one thousandth of an inch and a length of at least one-sixteenth of an inch, said through openings



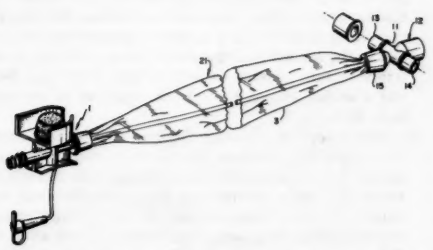
cause sufficient restriction to passage of a liquid therethrough to be able to maintain a pressure differential of approximately twenty millimeters of mercury between the liquid and the ambient.

5,073,164

SUCTION CATHETER

William H. Hollister, Box 458, E. Sullivan, N.H. 03445; Craig J. Bell, 27 Meadow Rd., E. Swanzey, Winchester, N.H. 03470, and Cary D. Carruthers, 185 Boykerville Rd., Troy, N.H. 03465

Filed May 2, 1990, Ser. No. 517,693
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—43 **6 Claims**



1. A suction catheter suitable for use in removing undesirable fluid from a patient, said suction catheter comprising:

a multilumen catheter tube suitable for insertion into a patient wherein said catheter tube contains a primary lumen having an inside diameter suitable for removing fluid from a patient upon application of a vacuum, and a secondary lumen contiguous with said lumen, having an inside diameter suitable for providing liquid for irrigation of the interior of said first lumen or for lavaging said patient and being defined by an interior wall of said catheter tube and an exterior wall of said primary lumen, the ratio of the interior cross-sectional area of said secondary lumen with respect to the interior cross-sectional area of said primary lumen being about 1:6 to about 1:8;

a patient connecting member mounted so as to surround said multilumen catheter tube in the vicinity of the distal end of said multilumen catheter tube, and wherein said distal end is suitable for insertion into a patient;

a vacuum connection member located in the vicinity of the proximal end of the multilumen catheter tube;

a protective sleeve surrounding at least the majority of the length of said catheter tube and extending between said patient connecting member and said vacuum connection member, wherein said protective sleeve is adapted to permit the distal end of said catheter tube to be extended from said protective sleeve into a patient and to be withdrawn from the patient; and

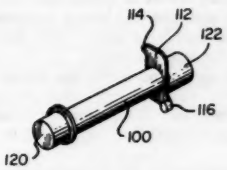
means for providing liquid to the interior of the said secondary lumen in the vicinity of the proximal end of said secondary lumen including a connecting tube having one end connected and in communication with said secondary lumen inside said protective sleeve.

5,073,165

HYPODERMIC JET INJECTOR AND CARTRIDGE THEREFOR

Bryant Edwards, Clarendon Hills, Ill., assignor to Marpam International, Inc., Ill.

Continuation of Ser. No. 152,467, Feb. 5, 1988, Pat. No. 4,874,367. This application Jul. 5, 1989, Ser. No. 375,509
The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.
Int. Cl.[5] A61M *5/30*
U.S. Cl. 604—72 **7 Claims**



1. A medicament containing integral cartridge adapted to be used with a jet injector gun, the gun comprising an elongated hollow body having an opening in one end; piston means positioned in the elongated body to move axially and longitudinally within the elongated body, spring means urging the piston means toward the opening, trigger means adapted to releasably hold the piston means away from the opening in opposition to the urging of the spring means, a plunger affixed to the piston means and extending through the opening in the elongated body; and cartridge engaging means affixed to the one end of said elongated body, the cartridge engaging means comprising a shoulder and a slot, the shoulder connected to the exterior of the elongated body adjacent to the opening in the one end of the elongated body, the slot positioned between the shoulder and the body, transverse to the axis of the elongated body;

said integral cartridge comprising:

an elongated tube having a closed end and an open end, an orifice positioned in said closed end;

an interrupted flange molded as a part of said tube adjacent to said open end, said flange extending transverse to the axis of said tube; and

a collar molded as part of said tube and forming a longitudinal extension of said tube extending beyond said interrupted flange, at said open end, of said tube;

a plug slidably positioned in the open end of said tube of said cartridge and a medicament in the space defined by said tube and said plug;

said collar and said flange defining means for cooperatively engaging said cartridge-engaging means so that said cartridge is removably locked onto the gun by inserting said collar into the opening in said one end of the elongated body of the gun with the interruption in said flange passing over the shoulder, surrounding the plunger with said collar, and rotating the cartridge to engage said interrupted flange with the slot in the shoulder and thereby lock said cartridge to the gun to maintain said cartridge in a locked position when the trigger means releases said piston means and the spring means urges the piston means toward the opening.

5,073,166

METHOD AND APPARATUS FOR EMPLACEMENT OF A GASTROSTOMY CATHETER

Stephen K. Parks, and Udi Fishman, both of San Jose; Damon M. Nuckolls, Sunnyvale, all of Calif., assignors to Medical Innovations Corporation, Milpitas, Calif.

Filed Feb. 15, 1989, Ser. No. 311,685
Int. Cl.[5] A61M *11/00*
U.S. Cl. 609—93 50 Claims

1. An apparatus for providing access through an opening in a surface, comprising:

an elongate tube having a proximal end, a distal end, and a main body, with an access passage through the tube;

anchoring means attached to said distal end for anchoring said elongate tube at said opening, said anchoring means having a first configuration wherein an outer diameter of said anchoring means is substantially equal to an outer diameter of said tube, and having a second configuration wherein said anchoring means outer diameter is greater than said tube outer diameter;

means for retaining said anchoring means in said second configuration, said retaining means including means for increasing resistance to repositioning to said first configuration when a radial force is applied to said anchoring means;

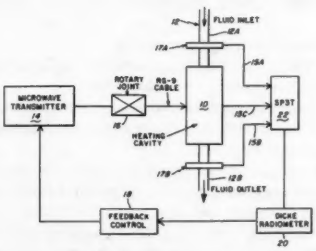
means for manipulating said anchoring means into each of said first and second configurations, for insertion of said anchoring means and a portion of the tube through the opening while said anchoring means is in said first configuration, and for manipulating said anchoring means into said second configuration.

5,073,167

IN-LINE MICROWAVE WARMING APPARATUS

Kenneth L. Carr, Harvard; Richard S. Grabowy, Concord, and Steven D. Schwaitzberg, Chestnut Hill, all of Mass., assignors to M/A-Com, Inc., Burlington, Mass.

Filed Jun. 26, 1987, Ser. No. 67,626
Int. Cl.[5] A61N *5/02*
U.S. Cl. 604—114 40 Claims



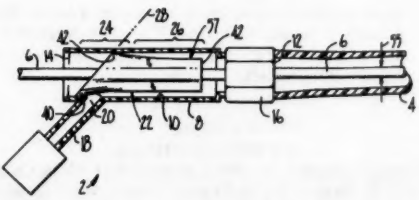
1. Microwave apparatus for the warming of a liquid flowing in a liquid conduit, said apparatus comprising: a microwave heating cavity, means for applying microwave energy at a selected power level to said microwave heating cavity, means for supporting a length of said liquid conduit in said microwave heating cavity extending between input and output sides thereof, microwave energy being applied to the conduit and to the fluid flowing therein, non-invasive temperature monitoring means for measuring the temperature of a liquid flowing in the liquid conduit at said cavity, said means for supporting a length of said liquid conduit comprising a support member that supports a predetermined length of said liquid conduit within the cavity wherein said predetermined length is greater than the distance between the input and output sides of said cavity so as to enhance heating action, and control means responsive to said measured temperature for controlling the power of said means for applying microwave energy.

5,073,168

Y-ADAPTOR AND PERCUTANEOUS SHEATH FOR INTRAVASCULAR CATHETERS

John W. Danforth, 875 25th Ave., San Francisco, Calif. 94121

Continuation of Ser. No. 253,812, Oct. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 230,621, Aug. 10, 1988, abandoned. This application Jul. 30, 1990, Ser. No. 560,241
Int. Cl.[5] A61M *5/178*
U.S. Cl. 604—167 17 Claims



1. A therapeutic catheter apparatus, comprising:

a therapeutic device having a first length;

a guiding catheter having a hollow interior;

an adapter adjacent said guiding catheter and contacting said therapeutic device having a main bore with first and second ends passing therethrough for introducing said therapeutic device into said guiding catheter; the adapter including a check valve positioned within the main bore for preventing fluid flow in a reverse direction from the first end to the second end, the check valve including an entrance section towards the second end of the main bore and a sealing section towards the first end of the main bore; and

the sealing section including flexible, conformable sheets having abutting sealing surfaces between which the therapeutic device passes and external surfaces, the sealing surfaces having a second axial length, less than said first length, the sheets being adapted to conformingly engage the therapeutic device and form a seal therewith along the full extent of said second axial length said sealing surfaces formed of a comformable, low resilience material, having a resilience sufficiently low that when said external surfaces are subjected to a fluid pressure not exceeding human blood pressure, said seal is formed solely in response to said fluid pressure acting on the external surfaces of the sheets while exerting low frictional resistance to insertion and removal of the therapeutic device.

5,073,169

TROCAR SUPPORT

Steve Raiken, 5152 Pickford Way, Culver City, Calif. 90230

Continuation-in-part of Ser. No. 591,969, Oct. 2, 1990, abandoned. This application Dec. 7, 1990, Ser. No. 624,294
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—180 5 Claims

1. A trocar support comprising:

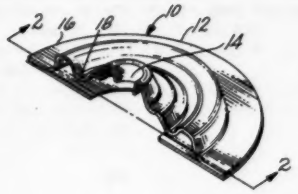
an elastomeric membrane having an aperture therein for receiving a trocar having an outer surface;

said membrane comprising three portions, an elongated wall potion surrounding said aperture, an outer flange portion, and an expandable bellowed intermediate portion therebetween; and

adhesive material at the flange portion to enable said membrane to adhere to a body surface;

said aperture being sized with respect to the outer surface of

a trocar to be disposed therein so as to form a tight fit and seal between the wall portion and the trocar, said intermediate portion being expandable to enable a trocar therein



to circumscribe an arc from a vertical centerline without imposing undue stress upon the adhesive surface of the flange portion.

5,073,170

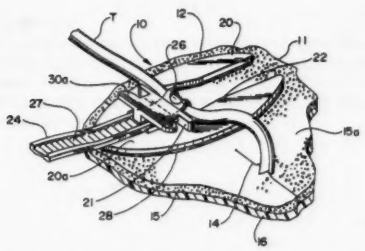
DRAINAGE TUBE RETENTION DEVICE

Barry L. Schneider, Deerfield, Ill., assignor to Hollister Incorporated, Libertyville, Ill.

Continuation of Ser. No. 564,571, Aug. 9, 1990, abandoned. This application Apr. 28, 1991, Ser. No. 676,564

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—180 **14 Claims**



1. A drainage tube retention device comprising a flexible pad having upper and lower surfaces and having a pressure-sensitive adhesive layer along its lower surface for adherence of the pad to a patient's skin; and tube retaining means upon said upper surface comprising a flexible mounting plate having a bottom surface secured to the upper surface of said pad and having a top surface with a transverse wall projecting upwardly from said top surface, said wall having an opening therethrough extending in a direction parallel with said top surface, a recess in said plate extending from one side of said wall immediately adjacent said opening to the outer periphery of said plate, a flexible strap formed integrally with said plate and extending outwardly from said wall through said recess and beyond said outer periphery of said plate, said strap being Y-shaped in configuration and including an elongated central tongue and a pair of laterally-spaced arms having distal ends merging with said tongue and having proximal ends joined to said plate at points lateral to said opening in said wall, said tongue having a free end portion and being of uniform width throughout substantially its full length, and releasable latching means for latching said strap when the same is reversely turned and the free end thereof is inserted through said opening in said wall from the direction of said arms.

5,073,171

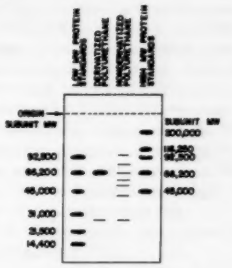
BIOCOMPATIBLE MATERIALS COMPRISING ALBUMIN-BINDING DYES

John W. Eaton, Carriage House, 57 Groveland Ter., Minneapolis, Minn. 55403

Filed Jan. 12, 1989, Ser. No. 296,496

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—266 **22 Claims**



1. A biocompatible prosthetic device having a solid polymeric body incorporating an amount of an albumin-binding dye effective to provide a means to form a coating of endogenous albumin on said device when said device is in contact with a physiological fluid containing albumin.

5,073,172

DEVICE FOR ASPIRATING WOUND FLUIDS

Helmut Fell, St. Ingbert, Fed. Rep. of Germany, assignor to Medinorm Aktiengesellschaft medizintechnische Produkte, Quierschied, Fed. Rep. of Germany

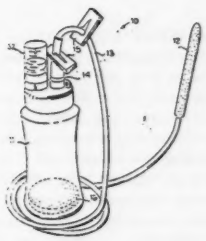
PCT No. PCT/DE88/00022, § 371 Date Sep. 25, 1989, § 102(e) Date Sep. 25, 1989, PCT Pub. No. WO88/05319, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 19, 1988, Ser. No. 415,269

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1987, 3701386; Apr. 2, 1987, 3711093; Jul. 24, 1987, 3724483; Oct. 30, 1987, 8714456[U]

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—119 **14 Claims**



1. A device for aspirating wound liquids, comprising a suction bottle with a connection system for the suction bottle embodied as a suction controlling device including:

a diaphragm;

a circular cylindrical diaphragm holder, of which an upper face is covered by the diaphragm with clearance between said upper face and said diaphragm for a hollow space, wherein a center opening and at least one additional opening feed into the upper face in a way such that each of said at least one additional opening is not covered by the diaphragm when the diaphragm closes the center opening; and

a circular cylindrical hollow cylinder closed on top by a closing wall and having the diaphragm holder with the diaphragm guided in its interior back and forth in the lengthwise direction, such diaphragm sealing against the inner wall of the cylinder.

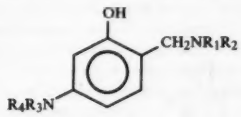
5,073,173

DYE COUPLERS

Yuh-Guo Pan, Stamford, Conn.; Alexander Chan, Mineola, N.Y., and Lana Hochman, Westport, Conn., assignors to Clairol Incorporated, Stamford, Conn.

Division of Ser. No. 353,925, May 18, 1990. This application Oct. 23, 1990, Ser. No. 602,035
Int. Cl.[5] A61K 7/13; C07C 211/00, 371/00
U.S. Cl. 8—405 24 Claims

1. A hair dye composition comprising by weight of the composition from about 0.001 to about 10% of an oxidative dye coupler of the structure:



(I)

wherein R_1 and R_2 may be the same or different and are hydrogen, C_1–C_6 alkyl or C_1–C_6 hydroxyalkyl, or form with the nitrogen atom to which they are attached a morpholine, piperdine or pyrollidine ring, and R_3 and R_4 are hydrogen, C_1–C_6 alkyl, C_1–C_6 hydroxyalkyl or C_1–C_6 acyl, and from about 0.001 to about 10% of a primary intermediate.

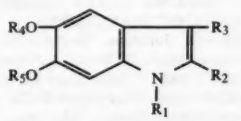
5,073,174

DYEING PROCESS EMPLOYING INDOLE DYES AND OXIDATION DYE PRECURSORS AND DYEING AGENTS EMPLOYED

Charles Vayssie, Villepinte; Daniel Bauer, Le Raincy; Francoise Richard, Montreuil, and Alex Junino, Livry-Gargan, all of France, assignors to L'Oreal, Paris, France

Filed Jul. 20, 1990, Ser. No. 554,873
Claims priority, application France, Jul. 21, 1989, 89 09836
Int. Cl.[5] A61K 7/13
U.S. Cl. 8—406 19 Claims

1. A process for dyeing keratinous fibers comprising applying to said fibers, in a first step, a composition (A) containing, in a medium suitable for dyeing said fibers and free from any oxidation catalyst and oxidation agent, at least one indole dye having the formula



(I)

wherein

R_1 represents hydrogen, lower alkyl or $—SiR_6R_7R_8$,

R_2 and R_3, each independently, represent hydrogen, lower alkyl, carboxyl, (lower alkoxy) carbonyl or $—COO-SiR_6R_7R_8$,

R_4 and R_5, each independently, represent hydrogen, linear or branched C_1–C_{20} alkyl, formyl, linear or branched C_2–C_{20} acyl, linear or branched C_3–C_{20} alkenoyl, $—SiR_6R_7R_8$, $—P(O)(OR_9)_2$ or $—SO_2OR_9$, or R_4 and R_5 together with the oxygen atoms to which they are attached form a ring optionally containing a carbonyl group, a methylene group a thiocarbonyl group, a $<P-(O)OR_9$ group or a $<CR_{10}R_{11}$ group,

R_9 and R_{10} represent hydrogen, or lower alkyl,

R_{11} represents lower alkoxy, monoalkylamino or dialkylamino,

R_6, R_7 and R_8, each independently, represent linear or branched lower alkyl,

and the acid addition salt with an inorganic or organic acid, and the corresponding alkali metal, alkaline earth metal or amine salt; said indole dye being present in said composition (A) in an amount ranging from 0.1 to 5 percent by weight; relative to the total weight of said composition (A), and

in a second step, applying to said fibers a composition (B) containing, in a medium suitable for dyeing said fibers and free from any oxidation catalyst and oxidation agent, (i) at least one para oxidation dye precursor selected from the group consisting of a paraphenylenediamine, a paraaminophenol and a heterocyclic para base selected from the group consisting of a pyridine derivative and a pyrimidine derivative or (ii) at least one rapid oxidation dye selected from the group consisting a trihydroxylated benzene derivative, diaminohydroxybenzene, aminodihydroxybenzene, a substituted aminohydroxybenzene, triaminobenzene, a substituted 1,2-dihydroxybenzene, brazilin, haematoxylin and alkanet extract or both (i) and (ii), said para oxidation dye precursor or said rapid oxidation dye or both being present in said composition (B) in an amount ranging from 0.05 to 3 percent by weight relative to the total weight of said composition (B),

said composition (B) optionally being mixed at the time of use with hydrogen peroxide.

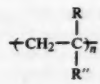
5,073,175

FLUOROOXIDIZED POLYMERIC MEMBRANES FOR GAS SEPARATION AND PROCESS FOR PREPARING THEM

Madhu Anand, Allentown; Pushpinder S. Puri, Macungie; Keith D. Campbell, Slatington, and Christine A. Costello, Easton, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Aug. 9, 1988, Ser. No. 230,409
Int. Cl.[5] B01D 53/22, 67/00
U.S. Cl. 55—16 39 Claims

1. A process for separating a feed gas mixture containing at least two components, said process comprising bringing said feed gas mixture into contact with a treated, semi-permeable, polymeric membrane comprising a polymer, cast into membrane form, having the structural formula:



wherein R and R'' can be the same or different linear, branched or cyclic alkyl group having one to twelve carbon atoms, or R can be H, with the proviso that both R and R'' cannot be methyl, and n is at least 100, which has been treated with a fluoro-oxidizing agent containing from about 0.01 to about 10 mole % available fluorine and from about 0.5 to about 99 mole % available oxygen, and wherein said membrane has a composite O_2/N_2 selectivity of at least 5.0 such that one component of said feed gas mixture selectively permeates said membrane thereby separating said feed gas mixture into a permeate stream enriched in said selectively permeable component and a reject stream depleted in said selectively permeable component.

5,073,176

DICARBOXYLIC ACID POLYESTERS AND POLYAMIDES FOR FLUID SEPARATION MEMBRANES

Samuel D. Arthur, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 5, 1990, Ser. No. 609,443
Int. Cl.[5] B01D 53/22, 71/56
U.S. Cl. 55—16 23 Claims

10. A selectively permeable membrane for fluid separations comprising a polymer derived from a dicarboxylic acid halide and a monomer selected from the group of aromatic diols, aromatic diamines, aliphatic diols, biphenols, aliphatic diamines, or mixtures thereof.

5,073,177
ROTATIONAL PARTICLE SEPARATOR

Jozef J. H. Brouwers, Enschede, Netherlands, assignor to B.B. Romico B.V. i.o., Astricht, Netherlands

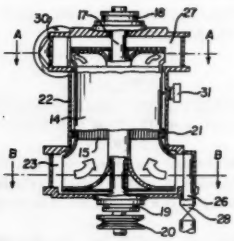
Continuation of Ser. No. 414,749, Sep. 27, 1989, Pat. No. 4,994,097, which is a continuation of Ser. No. 173,627, Mar. 25, 1988, abandoned. This application Oct. 15, 1990, Ser. No. 598,853

Claims priority, application Netherlands, Mar. 25, 1987, 8700698

The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.[5] B01D *50/00*

U.S. Cl. 55—317 **9 Claims**



1. A rotational particle separator for separating particulate material having cross-sectional dimensions from about 0.1 micron to about 5 microns from a gas, said separator comprising:

a housing having a gas inlet and a gas outlet

a centrifuge rotatably mounted in said housing along a rotation axis extending through said housing, said centrifuge including at least ten radially-spaced individual separation channels which extend parallel to each other and parallel to said rotation axis, each of said separation channels having a cross-section along substantially the entire length thereof which extends azimuthally about said rotation axis by less than 360° to prevent azimuthal flows greater than 360° about said rotation axis in any of said individual separation channels and each of said separation channels having a cross-sectional width less than 8 mm; and

means for rotating said centrifuge within said housing about said rotation axis.

5,073,178
CERAMIC FILTER FOR A DUST-CONTAINING GAS AND METHOD FOR ITS PRODUCTION

Takashi Mimori, Takasago; Hiroshi Maeno, Tokyo; Yasuhiko Endo, Yokohama, and Tomohiro Morishita, Kakogawa, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Apr. 5, 1990, Ser. No. 505,169

Claims priority, application Japan, Apr. 7, 1989, 1-86907; Apr. 25, 1989, 1-103537; May 1, 1989, 1-109189

Int. Cl.[5] B01D *46/24*

U.S. Cl. 55—523 **38 Claims**

1. A ceramic filter for a dust-containing gas, which comprises a filter base having an average pore size of from 10 to 100 μm, with the pore size ratio at positions of 75 vol% and 25 vol% of the accumulated pore size distribution being at least 1.3, and a filter layer having an average pore size of from 0.2 to 10 μm fixed at least to the filtering side surface of the filter base so that the filter layer substantially fills the pores open on the surface of the filter base.

5,073,179
METHOD FOR CONTROLLING FIBER DIAMETER DURING OPTICAL FIBER DRAWING PROCESS

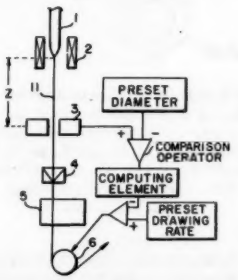
Ichiro Yoshimura; Yasuo Matsuda, and Yoshiki Chigusa, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 13, 1990, Ser. No. 509,958

Claims priority, application Japan, Apr. 14, 1989, 1-93217

Int. Cl.[5] C03B *37/025, 37/07*

U.S. Cl. 65—2 **2 Claims**



1. A drawing process for producing an optical fiber comprising the steps of;

heating an melting a preform for an optical fiber;

while heating and melting, drawing the optical fiber from the preform under tension to form the optical fiber; and

measuring an outer diameter of the optical fiber as it is being drawn at a position at which shrinkage of the outer diameter of the optical fiber is not larger than 0.5% , the drawing being carried out at a drawing rate that is controlled based on a deviation of the measured diameter from a preselected outer diameter.

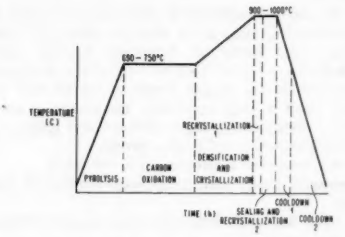
5,073,180
METHOD FOR FORMING SEALED CO-FIRED GLASS CERAMIC STRUCTURES

Shaji Farooq, Hopewell Junction; Govindarajan Natarajan, Pleasant Valley; Srinivasa S. N. Reddy, LaGrangeville; Richard A. Shelleman, Pleasant Valley; Nancy C. Stoffel, Ithaca, and Rao V. Vallabhaneni, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1991, Ser. No. 672,517

Int. Cl.[5] H05K *3/46;* **C03C** *8/24;* **C03B** *19/06*

U.S. Cl. 65—18.4 **60 Claims**



1. A method for forming a co-fired glass ceramic structure comprising the steps of:

forming at least one green sheet of a first crystallizable glass in a thermally decomposable binder;

metallizing said green sheet with a pattern of conductive paste comprising conductive metal, a second crystallizable glass and a thermally decomposable binder, said pattern comprising at least one via;

firing said green sheet according to the following firing cycle steps:

a. preheating said green sheet to a first temperature in a furnace with a neutral or reducing ambient so as to effect pyrolysis of said thermally decomposable binders, wherein said first temperature is insufficient to coalesce said first crystallizable glass or said conductive paste;

b. introducing a steam ambient into said furnace and then heating said green sheet in said furnace at said first temperature to burn off said pyrolyzed binders;

c. replacing said steam ambient with a neutral or reducing ambient and raising the temperature to a second temperature to effect densification and crystallization of said first and second glasses;

d. maintaining said second temperature for a predetermined time to effect sealing of said at least one via wherein for a first portion of said predetermined time, the ambient in said furnace is a neutral or reducing ambient and for a second portion of said predetermined time, the neutral or reducing ambient is replaced with a steam ambient; and

e. cooling said structure.

5,073,181

METHOD OF PROTECTING GLASS SURFACES USING SUBMICRON REFRACTORY PARTICLES

Gordon F. Foster, Campbell; Noshir B. Havewala, Corning, and Robert D. Shoup, Hammondsport, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Aug. 9, 1990, Ser. No. 564,748
Int. Cl.[5] C03B *40/033*
U.S. Cl. 65—24 **20 Claims**

1. A method of separating two otherwise contacting glass articles to protect their opposed surfaces during heat treatment, the method comprising coating at least one of the opposed glass surfaces with at least a monolayer of inert, refractory particles that are submicron in size and that remain nonadherent during thermal treatment, whereby the coating may be easily removed.

5,073,182

PROCESS FOR MANUFACTURING GLASS OBJECTS INCLUDING SPRAYING A CRYOGEN ONTO THE GLASS SURFACE

Franck Virey, Paris, and Daniel Goumy, Saint Egreve, both of France, assignors to L'Air Liquide, Societe Anonyme Pour L'Etudeet L'Exploitation Des Procedes Georges Claude, Paris, France

Continuation of Ser. No. 297,702, Jan. 17, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 489,858
Claims priority, application France, Jun. 19, 1987, 87 08666
Int. Cl.[5] C03B *32/00, 35/04*
U.S. Cl. 65—84 **9 Claims**

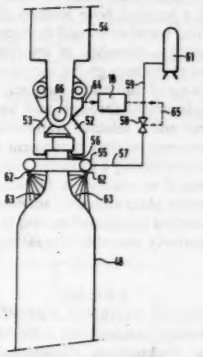
1. A process for manufacturing a glass object comprising the successive following steps:

a) supplying at least a first mould with a glass gob;

b) at least partially shaping a glass object from the glass gob in the first mould to form a shaped glass object;

c) extracting the shaped glass object from the first mould using a handling device and transporting with the handling device the extracted object still at a temperature where it is deformable;

d) spraying, during at least a part of step c) onto at least a determined outer part of the object and adjacent the handling device, a fluid cooled at a temperature lower than ambient temperature and at a flow rate which is kept lower than a flow rate limit value beyond which deformations of said part of the object occur; and



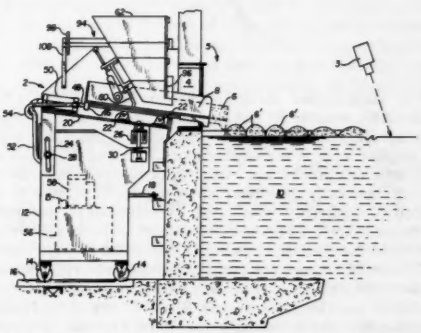
e) transferring the partially cooled object towards a further processing station, wherein the fluid to be sprayed contains a cryogen.

5,073,183

HYDRAULICALLY OPERATED BLANKET BATCH CHARGER

John A. Hammond, Washington, Pa., and Angelo J. Trunzo, Painesville, Ohio, assignors to Frazier-Simplex, Inc., Washington, Pa.

Filed Oct. 5, 1990, Ser. No. 593,117
Int. Cl.[5] C03B *3/00*
U.S. Cl. 65—335 **15 Claims**



1. A blanket charger for feeding raw batch to a glass making furnace, said blanket charger of the type having a main support frame with a raw batch hopper chute thereon and a reciprocable charger plate positioned under the hopper chute for receiving raw batch material therefrom, the improvement comprising:

fluid driven actuation means for reciprocating said charger plate and for regulating a stroke length and travel speed of said charger plate;

wherein the fluid actuation means includes first and second limit switch means mounted on the support frame adjacent said reciprocable charger plate and further includes firs and second adjustable striker rod means mounted on said charger plate, each of said striker rod means adapted to engage a respective limit switch at a forward stroke and at a rearward stroke of said charger plate and wherein a desired travel distance of said forward and rearward

strokes may be obtained by selective adjustment of said striker rod means; and wherein each of the first and second striker rod means comprises a block member secured to the charger plate, said block member having a horizontal bore and a vertical bore formed therein for slidably receiving a rod member in said horizontal bore, said rod member having a plurality of spaced-apart, transverse bores formed therethrough for incremental registry with the vertical bore of said block member, a removable locking pin for placement through said vertical bore of said block member and a selected transverse bore of said rod member to prevent relative movement therebetween, said rod member also having a threaded coaxial bore formed at one end thereof to receive a threaded adjustment rod therein, a striker plate assembly adapted to engage one of said limit switched positioned on said threaded adjustment rod and selectively movable therealong.

5,073,184

FUNGICIDAL THIENYL PROPENOATES

Vivienne M. Anthony, Maidenhead; John M. Clough, Marlow; Paul deFraine, Wokingham; Christopher R. A. Godfrey, Bracknell, and Kevin Beautement, Wokingham, all of England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 378,076, Jul. 11, 1989, which is a division of Ser. No. 39,449, Apr. 17, 1987, Pat. No. 4,863,503. This application Apr. 9, 1990, Ser. No. 506,152

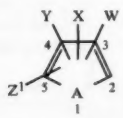
Claims priority, application United Kingdom, Apr. 17, 1986, 8609452

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.[5] **A01N** *43/06;* **C07D** *333/24, 333/36, 333/38*

U.S. Cl. 71—90 **6 Claims**

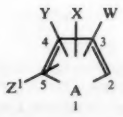
1. A compound of formula (I):



(I)

or a stereoisomer thereof, wherein W is $R^1O_2C—C=CH—ZR^2$, wherein R^1 and R^2, which are the same or different, are alkyl or fluoroalkyl groups, and Z is either an oxygen or sulphur atom; A is a sulphur atom; X, Y and Z^1, which are the same or different, are hydrogen or halogen atoms, or hydroxy, optionally substituted alkyl, optionally substituted cycloalkyl, optionally substituted cycloalkylalkyl, optionally substituted aralkyl, optionally substituted aryloxyalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted aryl, optionally substituted alkoxy, optionally substituted arylalkoxy, optionally substituted aryloxy, acyloxy, —NR′R″, —NHCOR′, wherein R′ and R″ are defined below, optionally substituted arylazo, nitro, cyano, $—CO_2R^6$, $—CONR^7R^8$, $—COR^9$, $—CR=NR^{10}$, $—CR=NOR^{10}$, or $—N=CR^{11}R^{12}$; and R, R^6, R^7, R^8, R^9, R^{10}, R^{11} and R^{12}, which are the same or different, are hydrogen atoms or optionally substituted alkyl, optionally substituted cycloalkyl, optionally substituted cycloalkylalkyl, optionally substituted aralkyl, optionally substituted aryloxyalkyl, optionally substituted alkenyl, optionally substituted alkynyl or optionally substituted aryl groups; or a metal complex thereof provided that one of X, Y and Z′ is not a hydrogen or halogen atom or a hydroxy, optionally substituted alkyl, optionally substituted alkoxy, amino or acylamino group wherein the alkyl substituents are selected from the group consisting of hydroxy, halogen, alkoxy carbonyl and trifluoromethyl; the alkoxy, cycloalkyl and cycloalkyl alkyl substituents are selected from the group consisting of halogen, hydroxy and C_{1-4} alkoxy; the arylazo, aralkyl, aryl, aryl oxyalkyl, arylalkoxy and aryloxy substituents are selected from the group consisting of halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, halo(C_{1-4}) alkyl, halo(C_{1-4})alkoxy, C_{1-4} alkylthio, C_{1-4} alkoxy(C_{1-4})alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, aryl, aryloxy, aryl(C_{1-4})alkyl, aryl(C_{1-4})alkoxy, aryloxy(C_{1-4})alkyl, acyloxy, cyano thiocyanato, nitro, —NR′R″, —NHCOR′, —NHCONR′R″, —CONR′R″, —COOR″, $—OSO_2R'$, $—SO_2R'$, —COR′, —CR′=NR″ or —N=CR′R″ in which R′ and R″ are independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy, C_{1-4} alkylthio, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, phenyl or benzyl; and the alkenyl and alkynyl substituent is phenyl.

6. A method of regulating plant growth which comprises applying to a plant an effective amount of a plant growth regulating compound of formula (I)



(I)

or a stereoisomer thereof, wherein W is $R^1O_2C—C=CH—ZR^2$, wherein R^1 and R^2, which are the same or different, are alkyl or fluoroalkyl groups, and Z is either an oxygen or sulphur atom; A is a sulphur atom, $—NR^3—$, or $—CR^4R^5$; X, Y and Z^1, which are the same or different, are hydrogen or halogen atoms, or hydroxy, optionally substituted alkyl, optionally substituted cycloalkyl, optionally substituted cycloalkylalkyl, optionally substituted aralkyl, optionally substituted aryloxyalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted aryl, optionally substituted alkoxy, optionally substituted arylalkoxy, optionally substituted aryloxy, acyloxy, —NR′R″, —NHCOR′, wherein R′ and R″ are defined below, optionally substituted arylazo, nitro, cyano, $—CO_2R^6$, $—CONR^7R^8$, $—COR^9$, $—CR=NR^{10}$, $—CR=NOR^{10}$, or $—N=CR^{11}R^{12}$; and R, R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11} and R^{12}, which are the same or different, are hydrogen atoms or optionally substituted alkyl, optionally substituted cycloalkyl, optionally substituted cycloalkylalkyl, optionally substituted aralkyl, optionally substituted aryloxyalkyl, optionally substituted alkenyl, optionally substituted alkynyl or optionally substituted aryl; or a metal complex thereof wherein the alkyl substituents are selected from the group consisting of hydroxy, halogen, alkoxy carbonyl and trifluoromethyl; the alkoxy, cycloalkyl and cycloalkyl alkyl substituents are selected from the group consisting of halogen, hydroxy and C_{1-4} alkoxy; the arylazo, aralkyl, aryl, aryl oxyalkyl, arylalkoxy and aryloxy substituents are selected from the group consisting of halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, halo(C_{1-4})alkyl, halo(C_{1-4})alkoxy, C_{1-4} alkylthio, C_{1-4} alkoxy(C_{1-4})alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, aryl, aryloxy, aryl(C_{1-4})alkyl, aryl(C_{1-4})alkoxy, aryloxy(C_{1-4})alkyl, acyloxy, cyano thiocyanato, nitro, —NR′R″, —NHCOR′, —NHCONR′R″, —CONR′R″, —COOR″, $—OSO_2R'$, $—SO_2R'$, —COR′, —CR′=NR″ or —N=CR′R″ in which R′ and R″ are independently hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy, C_{1-4} alkylthio, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-4})alkyl, phenyl or benzyl; and the alkenyl and alkynyl substituent is phenyl.

5,073,185

HETEROCYCLICALLY SUBSTITUTED N-SULTAMSULFONAMIDES

Lothar Willms, Hillscheid; Klaus Bauer, Hanau; Hermann Bieringer, Eppstein/Taunus, and Helmut Bürstell, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

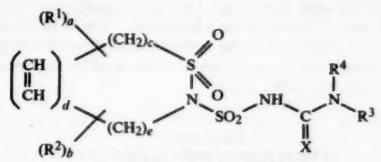
Division of Ser. No. 263,817, Oct. 28, 1988, Pat. No. 4,925,480. This application Mar. 15, 1990, Ser. No. 493,946

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736959

Int. Cl.[5] A01N *43/66;* C07D *417/12*

U.S. Cl. 71—091 11 Claims

1. A compound of formula I or a salt thereof



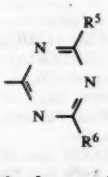
(I)

wherein:

R^1 and R^2 independently of one another are hydrogen, halogen, or are (C_1–C_8)-alkyl, (C_2–C_8)-alkenyl, (C_2–C_8)-alkynyl or (C_1–C_8)-alkoxy each of which is unsubstituted or mono- or polysubstituted by halogen or is mono- or disubstituted by (C_1–C_4)-alkoxy or (C_1–C_4)-alkylthio; or are —$(CH_2)_n$—$COOR^{11}$, where n is an integer from 0 to 2,

R^3 hydrogen, (C_1–C_8)-alkyl, (C_2–C_8)-alkenyl or (C_2–C_8)-alkynyl;

R^4 is a heterocyclic radical of formula



R^5 and R^6 independently of one another are hydrogen, halogen or (C_1–C_4)-alkyl or (C_1–C_4)-alkoxy, each of which is unsubstituted or mono- or polysubstituted by halogen; or are di-[(C_1–C_4)-alkoxy]-(C_1–C_2)-alkyl; (C_3–C_6)-cycloalkyl, —$OCHR^8COOR^9$; —NR^9R^{10} or (C_1–C_4)-alkylthio;

R^7 is (C_1–C_4)-alkyl;

R^8 is hydrogen or (C_1–C_4)-alkyl;

R^9 and R^{10} independently of one another are hydrogen, (C_1–C_4)-alkyl; (C_2–C_4)-alkenyl or (C_2–C_4)-alkynyl;

R^{11} is hydrogen, or (C_1–C_8)-alkyl, (C_2–C_4)-alkenyl or (C_2–C_4)-alkynyl each of which is mono- or polysubstituted by halogen or (C_1–C_4)-alkoxy radicals;

X is oxygen or sulfur; and

a, b, c, d and e independently of one another are 0, 1 or 2, with the proviso that the sum of c, d and e$\geqq$2.

10. A method for controlling undesired plant growth which comprises applying a herbicidally effective amount of a compound of formula I, or salt thereof, as claimed in claim 1 to a plant or to an area where said plant is grown.

5,073,186

5-THIOXO-2-IMIDAZOLINYL BENZOIC ACIDS, ESTERS, SALTS & RELATED COMPOUNDS, AND USE THEREOF AS HERBICIDAL AGENTS

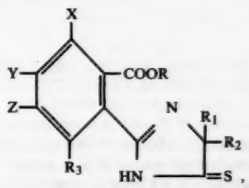
Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 629,296, Jul. 9, 1984, Pat. No. 4,911,747, which is a continuation-in-part of Ser. No. 519,615, Aug. 2, 1983, abandoned. This application Jan. 11, 1990, Ser. No. 463,590

Int. Cl.[5] A01N *43/48;* C07D *233/04*

U.S. Cl. 71—92 20 Claims

1. A compound having the structure:



(I)

wherein R is hydrogen;

C_1–C_{12} alkyl optionally substituted with one of the following groups: C_1–C_4 alkoxy, halogen, hydroxyl, C_3–C_6 cycloalkyl, benzyloxy, furyl, phenyl, halophenyl, C_1–C_4 alkylphenyl, C_1–C_4 alkoxyphenyl, nitrophenyl, carboxyl, C_1–C_3 alkoxycarbonyl, cyano or tri(C_1–C_3)alkylammonium;

C_3–C_{12} alkenyl optionally substituted with one of the following groups: C_1–C_3 alkoxy, phenyl, halogen, or C_1–C_3 alkoxycarbonyl or with two C_1–C_4 alkoxy groups or two halogen atoms;

C_3–C_6 cycloalkyl optionally substituted with one or two C_1–C_3 alkyl groups;

C_3–C_{10} alkynyl; or, a cation;

R_1 and R_2 each represent C_1–C_3 akyl or cyclopropyl, with the proviso that the sum of the number of carbon atoms in R_1 and R_2 is 2 to 5; and when R_1 and R_2 are taken together with the carbon to which they are attached, they may form a C_3–C_6 cycloalkyl ring optionally substituted with methyl;

X is hydrogen, halogen, or methyl;

Y and Z are each hydrogen, halogen, C_1–C_6 alkyl, C_1–C_4 hydroxyalkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4 haloalkyl, OCF_2CHF_2, OCF_3, $OCHF_2$, nitro, cyano, NR_4R_5, C_3–C_8 straight or branched alkenyloxy optionally substituted with one to three halogens, C_3–C_8 straight or branched alkynyloxy optionally substituted with one to three halogens, or phenyl optionally substituted with one C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen;

R_3 is hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 alkythio, C_1–C_4 alkoxy, CF_3, NO_2, OCF_3, $OCHF_2$ or OCF_2CHF_2;

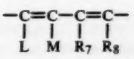
R_4 is hydrogen or C_1–C_4 alkyl;

R_5 is C_1–C_4 alkyl;

And, when taken together, Y and Z may form a ring in which YZ is represented by

(1) the structure: —$(CH_2)_n$—, where n is an integer of 2, 3 or 4; or

(2) by the structure:



where, L, M R_7 and R_8 each represent hydrogen, halogen, C_1–C_4 or C_1–C_3 alkoxy, and X is hydrogen;

and when R_1 and R_2 are not the same, the optical isomers thereof and except when R is a cation, the acid addition salts thereof.

5,073,187

PYRAMIDINE DERIVATIVES

Raymond Elliott, Lower Early, Great Britain, assignor to Imperial Chemical Industries PLC, London, England

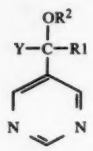
Filed May 30, 1989, Ser. No. 357,969

Claims priority, application United Kingdom, Jun. 14, 1988, 8814026

Int. Cl.[5] C07D *239/26;* A01N *43/54*

U.S. Cl. 71—92 4 Claims

1. A pyrimidine compound having the formula (I):



(I)

and stereoisomers thereof, wherein Y is an optionally halo-substituted 1,1-dimethylpropyl group; R′ is a group —C≡C—A or —C≡C—R′ wherein A is a phenyl group optionally substituted by one or more substituents selected from the group consisting of halogen, lower alkyl, cycloalkyl containing from 3 to 6 carbon atoms, lower alkoxy, lower haloalkyl, lower alkoxycarbonyl, lower alkyl carbonyl, nitro and cyano and wherein R′ is an optionally halo-substituted alkyl group containing from 2 to 4 carbon atoms; and R^2 is hydrogen agrochemically acceptable salts or metal complexes of the compounds of formula (I).

3. A plant growth regulating composition comprising a plant growth regulating amount of a pyrimidine derivative according to claim 1 and an agrochemcially acceptable carrier or diluent.

5,073,188

HERBICIDAL AMIDES OF 4-TRIFLUOROMETHYL-3′-CARBOXYL-4′-NITRODIPHENYL ETHERS

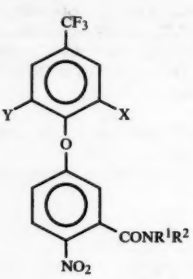
Wayne O. Johnson, Warminster, Pa., assignor to Rohm and Haas Company, Philadelpha, Pa.

Continuation of Ser. No. 626,598, Jul. 5, 1984, abandoned, which is a continuation of Ser. No. 315,098, Oct. 21, 1981, abandoned, which is a division of Ser. No. 907,636, May 19, 1978, abandoned. This application Sep. 8, 1987, Ser. No. 96,217

Int. Cl.[5] A01N *33/02, 33/16;* C07C *255/50;* C07D *279/04, 211/06, 279/06*

U.S. Cl. 71—92 13 Claims

10. A compound of the formula



wherein

X is a cyano group,

Y is a hydrogen atom or a halogen atom,

R^1 is a hydroxy group or a (C_1–C_4)alkoxy group, and

R^2 is a (C_1–C_4)alkyl group substituted with a halogen atom, a cyano group, a thiol group, a (C_1–C_4)alkylthio group, a carboxy group or an agronomically acceptable salt thereof, or a carb(C_1–C_4)alkoxy group, or a monocyclic (C_5–C_7)cycloalkyl group.

5,073,189

PESTICIDAL AQUEOUS FLOWABLE COMPOSITIONS

Mark Bell, Fareham, England, assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 153,530, Feb. 3, 1988, abandoned, which is a continuation of Ser. No. 780,525, Sep. 27, 1985, abandoned. This application Jan. 19, 1990, Ser. No. 467,819

Int. Cl.[5] A01N *43/52*

U.S. Cl. 71—92 7 Claims

1. A pesticidal aqueous flowable concentrate composition comprising on a weight to volume basis 10% to 40% of a finely ground particulate mixture of pesticides wherien said mixture comprises methyl (6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-m-toluate and methyl 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-p-toluate suspended in an aqueous solution, containing 5% to 40% by weight of a nonionic polyoxyethylene surfactant with about 9 to 13 moles of ethoxylation which as a 25% aqueous solution has a kinematic viscosity of about 5 to about 100 centistokes as the vehicle for the flowable composition wherein said composition is stable without thickening agents, clays, or soluble gums.

5,073,190

SUBSTITUTED PHTHALIMIDO CYCLOHEXANECARBOXAMIDES AND COMPOSITIONS THEREOF FOR ENHANCING GROWTH OF HYBRID TEA ROSE PLANTS

Cyril A. Kust, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 448,771, Dec. 11, 1989, Pat. No. 5,019,154. This application Mar. 18, 1991, Ser. No. 712,000

Int. Cl.[5] A01N *43/38;* C07D *209/34*

U.S. Cl. 71—95 3 Claims

1. A compound 1-(3-chloro-4- methyl-phthalimido)-cyclohexanecarboxamide.

2. A composition for regulating the growth of a hybrid tea rose plant which comprises an effective growth regulating amount of a compound 1-(3-chloro-4-methyl-phthalimido)-cyclohexanecarboxamide and an inert carrier.

5,073,191

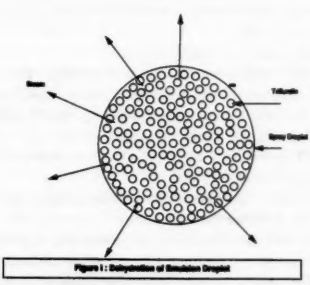
MICROENCAPSULATED AGRICULTURALLY ACTIVE MATERIAL

John Misselbrook, Lawrenceville, N.J.; Edwin F. Hoff, Jr.; Elliot Bergman, Valdosta, Ga.; Larry J. McKinney, Hahira, Ga., and James H. Lefiles, Valdosta, Ga., assignors to Griffin Corporation, Valdosta, Ga.

Division of Ser. No. 301,458, Jan. 24, 1989. This application Nov. 27, 1989, Ser. No. 441,533

Int. Cl.[5] A01N *33/08, 25/28*

U.S. Cl. 71—121 12 Claims



1. A dry herbicidal composition having improved stability,

wetting, dispersibility and suspensibility comprising alpha, alpha, alpha-trifluoro-2,6-dinitro-N,N-di-n-propyl-p-toluidine in a polymorphic form characterized by a yellow color and a melting point of approximately 41°–43° C. microencapsulated in a water-soluble microcapsule, said microcapsule substantially maintaining said polymorphic form and being substantially free of a solvent for said alpha, alpha, alpha-trifluoro-2,6-dinitro-N,N-di-n-propyl-p-toluidine.

5,073,192

DIPHENYL ETHER HERBICIDES

Michael T. Clark, and Ian J. Gilmore, both of Sittingbourne, England, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

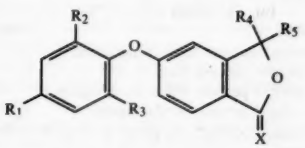
Continuation of Ser. No. 230,099, Aug. 9, 1988, abandoned. This application Oct. 2, 1990, Ser. No. 592,517

Claims priority, application United Kingdom, Sep. 1, 1987, 8720509

Int. Cl.[5] A01N *43/08*

U.S. Cl. 71—88 **13 Claims**

1. A phenoxy phthalide derivative of the general formula II



(II)

wherein R_1 represents a hydrogen or halogen atom or a C_{1-4} alkyl or a C_{1-4} haloalkyl group; R_2 and R_3, which may be the same or different, each independently represents a hydrogen or halogen atom or a C_{1-4} alkyl, a C_{1-4} haloalkyl, nitro or cyano group; R_4 represents a C_{1-5} alkyl group; R_5 represents a C_{2-5} alkenyl or alkynyl group; and X represents an oxygen or sulphur atom.

5,073,193

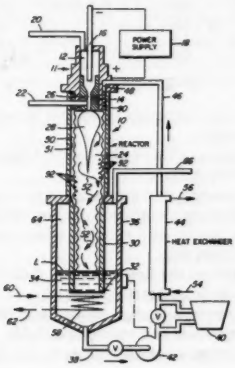
METHOD OF COLLECTING PLASMA SYNTHESIZE CERAMIC POWDERS

Asoke C. D. Chaklader; Robert G. Butters, both of Vancouver, and Douglas A. Ross, Richmond, all of Canada, assignors to The University of British Columbia, Vancouver, Canada

Filed Jun. 26, 1990, Ser. No. 543,402

Int. Cl.[5] B22F *9/14; C23C 15/00*

U.S. Cl. 75—346 **14 Claims**



1. A method of forming and collecting sub micron sized ceramic or cermet powder material in a chamber having an inner wall surface comprising injecting a reactor flame and reactants into one end of said chamber, flowing a film of collecting liquid in hugging relationship with said inside surface to form an annular film of collecting liquid surrounding said flame flowing from said one end to an opposite end of said chamber and collecting said film in a pool of said collecting liquid at said opposite end, sealing said opposite end by a surface of said pool, collecting said particulate material formed in said chamber in said collecting liquid, continuously circulating said collecting liquid from said pool to said one end to form said annular film of collecting liquid passing in hugging relationship with said surface and separating said particulate material from said collecting liquid.

5,073,194

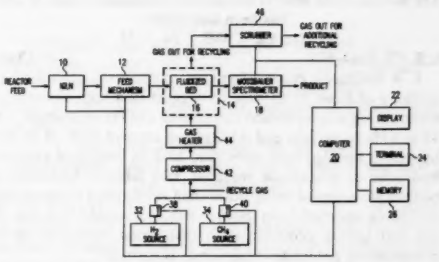
PROCESS FOR CONTROLLING THE PRODUCT QUALITY IN THE CONVERSION OF REACTOR FEED INTO IRON CARBIDE

Frank A. Stephens, Arvada; John P. Hager, Golden, and Frank M. Stephens, Jr., Lakewood, all of Colo., assignors to Iron Carbide Holdings, Limited, Lakewood, Colo.

Filed Aug. 1, 1990, Ser. No. 561,077

Int. Cl.[5] C22B *5/14; C01B 31/30*

U.S. Cl. 75—376 **21 Claims**



1. A method for monitoring and maintaining the quality of a product mainly comprising iron carbide produced in a fluidized bed reactor from reactor feed, said method comprising the steps of:

(a) determining concentrations of individual phases in a sample of the iron carbide-containing product;

(b) determining whether the concentrations of the individual phases of the product are acceptable; and

(c) adjusting one or more process parameter to change one or more of the concentrations if the concentrations are determined not to be acceptable in said step (b).

5,073,195

AQUEOUS SILANE WATER REPELLENT COMPOSITIONS

Robert L. Cuthbert, Bay City, and Edwin P. Plueddemann, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 543,981, Jun. 25, 1990. This application Feb. 4, 1991, Ser. No. 650,121

The portion of the term of this patent subsequent to Sep. 24, 2008, has been disclaimed.

Int. Cl.[5] C07G *1/00*

U.S. Cl. 106—2 **25 Claims**

1. A composition comprising an aqueous solution of a water soluble silane coupling agent and an alkyltrialkoxysilane, the alkyltrialkoxysilane being selected from the group consisting of alkyltrialkoxysilanes with C_1 to C_6 alkyl groups on silicon and a blend of alkyltrialkoxysilanes each with C_1 to C_6 alkyl groups on silicon, the alkyltrialkoxysilane and the silane coupling agent being present in the aqueous solutions in the mole ratio of between about 0.5:1.0 to about 3.0:1.0.

5,073,196

NON-ACCELERATED IRON PHOSPHATING

Nicephoros A. Fotinos, Royal Oak, and Gary D. Kent, Sterling Heights, both of Mich., assignors to Henkel Corporation, Ambler, Pa.

Filed May 18, 1989, Ser. No. 353,853
Int. Cl.[5] C23F 7/14
U.S. Cl. 106—287.19 20 Claims

1. A liquid composition of matter, consisting essentially of: (A) water; (B) from about 3 to about 100 g/L of dissolved total phosphate; (C) from about 0.01 to about 1.0 g/L stoichiometric equivalent of dissolved titanium, in the form of titanium containing anions; (D) up to about 5 g/L of total fluoride; and (E) up to about 50 g/L of surfactant, said composition having a total acid number between about 4 and about 30, a free acid or acid consumed number not greater than about 1, and a pH between about 2.5 and about 6.

5,073,197

CEMENT COMPOSITIONS

Amalendu J. Majumdar, St. Albans, and Bahadur Singh, Watford, both of England, assignors to National Research Development Corporation, London, England

Filed Aug. 3, 1989, Ser. No. 388,798
Claims priority, application United Kingdom, Aug. 12, 1988, 8819212; Oct. 12, 1988, 8823890
The portion of the term of this patent subsequent to Oct. 9, 2007, has been disclaimed.
Int. Cl.[5] C04B 7/14, 7/32
U.S. Cl. 106—692 19 Claims

1. A hydraulic cement-forming composition consisting essentially of from 30 to 70% by weight of a high-alumina cement having a composition comprising CaO in an amount from 35 to 45% by weight and Al_2O_3 in an amount from 38 to 55% by weight blended with from 70 to 30% by weight of a latently hydraulic or pozzolanic material, said latently hydraulic or pozzolanic material being other than solely blast furnance slag and being selected from gasifier slag, pulverized fuel ash, fly ash and natural pozzolan such that, upon hydration of the composition, gehlenite octahydrate is formed.

5,073,198

METHOD OF PREPARING BUILDING MATERIALS

Fredrik W. A. Kurz, Nysatravagen 12, S-181 61 Lindingo, Sweden

Continuation-in-part of Ser. No. 344,208, Apr. 27, 1989, abandoned, which is a continuation-in-part of Ser. No. 71,794, filed as PCT/SE86/00473, Oct. 14, 1986, abandoned. This application Aug. 9, 1990, Ser. No. 565,246
Claims priority, application Sweden, Oct. 14, 1985, 8504754
Int. Cl.[5] C04B 7/153
U.S. Cl. 106—791 15 Claims

1. In a method of making a building material by activation of latently hydraulic ground granulated amorphous basic blast-furnace slag having lime as one of its components to form a direct acting hydraulic binder, wherein said method comprises mixing the slag with water, sand, gravel and an activator, said slag, water, sand, gravel, and activator being present in amounts effective to enable the slag to react chemically with the water, in combination with the sand and gravel, to produce a concrete of desired strength with the slag and activator acting as binding agents, the improvement comprising forming the activator as a combination of portland cement, an acidic component and a basic component, wherein the acidic component is a phosphate or a mixture of phosphates in an amount of 2 to 40% by weight based on the amount of the binding agents, said phosphate or mixture of phosphates having surface tension reducing action or said method further comprising adding a detergent or mixture of detergents to said binding agents in an amount of 0.1 to 2% by weight of the binding agents, and wherein the basic component is present in an amount of 2 to 20% by weight based on the amount of the binding agents, said basic component being magnesium oxide, or magnesium oxide in combination with earth metal oxides selected from the group consisting of calcium oxide, aluminum oxide, titanium oxide, zirconium oxide, and zinc oxide, with the amount of calcium oxide not exceeding 3% by weight based on the slag; said portland cement being present in an amount effective to increase the mechanical strength of the building material but not exceeding 40% by weight based on the slag, and the concentration of the lime in the slag and of the calcium in the activator being such that the building material has a sufficiently low calcium content whereby substantially to preclude carbonation within said building material, said improvement causing the formation of a concrete of great mechanical strength and high chemical resistance with the magnesium oxide and phosphate or mixture of phosphates incorporated into the concrete without the need for heating at a high temperature.

5,073,199

INSULATING MATERIAL CONTAINING PITCH BASED GRAPHITE FIBER

Thomas R. Krowl, Littleton, Colo., and Norman Scheffer, Chelmsford, Mass., assignors to BNZ Materials, Inc., Littleton, Colo.

Filed Nov. 27, 1990, Ser. No. 618,496
Int. Cl.[5] C04B 2/02, 14/38
U.S. Cl. 106—797 15 Claims

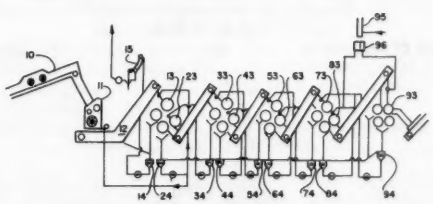
1. An insulating material comprising about:
a. 15 to 40 weight percent lime;
b. 15 to 40 weight percent siliceous component;
c. 15 to 50 weight percent wollastonite;
d. 0 to 15 weight percent inorganic fiber to provide green strength; and
e. 0.5 to 15 weight percent organic fiber wherein 1.5 to 5 weight percent is pitch base graphitic fiber.

5,073,200

LOW PRESSURE SYSTEM FOR EXTRACTION OF SOLUBLE MATTER FROM FIBROUS MATERIAL

Wilhelm Leibig, Riva, Md., assignor to Biotecnologia y Derivados de Morelos, Sa De CV, Mexico

Filed Apr. 10, 1990, Ser. No. 507,666
Claims priority, application Mexico, Apr. 21, 1989, 15757
Int. Cl.[5] C13D 1/12; B01D 12/00; B30B 7/04, 15/30
U.S. Cl. 127—2 8 Claims



1. Apparatus for extraction of soluble matter from fibrous material, comprising:
a) means for maceration of disintegrated fibrous material to extract soluble matter;
b) means for passing the first macerate to compression step;
c) first low pressure compression means for the first macerate and for passing said material with a conveyor to the next maceration step;
d) means to collect the first expressed fluid and maceration fluid from the disintegrated material;
e) means to separate foreign matter and fibrous residuals from the expressed and maceration fluids;
f) means to return separated matter to the first maceration step;
g) means for second maceration for adding expressed fluid from subsequent low pressure compression means and to

produce a second macerate, and for passing said second macerate to a second low pressure compression means;

h) means to collect the second and subsequent expressed fluid;

i) means for passing a variable portion of said expressed fluid to the first maceration means and to the macerate entering the first compression step;

j) means for third maceration for adding expressed fluid from subsequent low pressure compression means to produce a third macerate and for passing said third macerate to a fourth low pressure compression means;

k) at least one or a plurality of additional sequences of maceration means, low pressure compression means, fluid collecting means;

l) means for passing the fibrous material from the last low pressure compression means to a high pressure dewatering means;

m) means for final maceration of fibrous material entering the high pressure dewatering means;

n) means for passing a variable portion of the final maceration fluid to produce macerate entering to the high pressure dewatering means;

o) means for passing a variable portion of the final maceration fluid to produce macerate entering the last low pressure compression means;

p) means for predewatering the macerate entering the high pressure dewatering means;

q) means for passing fluid from predewatering means to macerate entering the last low pressure compression means;

r) high pressure dewatering means for dewatering final macerate and to express final fluid;

s) means for passing final fluid obtained from high pressure dewatering means to macerate entering the last low compression step;

t) means to allow over flow of the expressed fluid collected from all compression means only toward the front end of the process means.

5,073,201

PROCESS FOR PRODUCING A HIGH TOTAL DIETARY CORN FIBER

J. E. Todd Giesfeldt, 414 S. 8th Ave., La Grange, Ill. 60525; Robert J. Repta, 7722 W. Cashew, Orland Park, Ill. 60462, and Irving F. Deaton, 8610 240th SW#36, Edmonds, Wash. 98020

Continuation-in-part of Ser. No. 211,188, Jun. 23, 1988, Pat. No. 4,994,115. This application May 3, 1990, Ser. No. 518,723

The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.[5] C08B *30/00*

U.S. Cl. 127—67 **22 Claims**

1. A continuous process for producing a corn fiber product having a high dietary fiber content which comprises:

a) diluting crude fiber obtained from the corn wet-milling process with water to prepare an aqueous slurry of crude corn fiber having a solids concentration of from about 2% to about 5% by weight;

b) passing said aqueous slurry of crude corn fiber through a hydroclone wherein the operating pressure of the hydroclone is adjusted to optimize recovery of fiber from the overflow stream from the hydroclone;

c) passing said overflow stream from the hydroclone into a first centrifugal paddle screen which is operated at an effective operating speed and has screen openings which are sized to maximize the amount of starch and protein which passes through the screen and minimize loss of fiber, and the clearance between the screen and the paddles is selected to optimize scrubbing the fiber to remove starch and protein; and

d) washing the solid separated by the first centrifugal paddle screen in two washing stages wherein the first washing stage includes diluting said solid with water and the second washing stage includes passing the solid material taken from the first washing stage through a second centrifugal paddle screen.

5,073,202

METHOD OF USING A BIODEGRADABLE SUPERABSORBING SPONGE

Donald F. H. Wallach, Brookline, Mass., assignor to Micro Vesicular Systems, Inc., Nashua, N.H.

Division of Ser. No. 320,944, Mar. 9, 1989, Pat. No. 4,959,341. This application Jul. 12, 1990, Ser. No. 552,587

Int. Cl.[5] B08B *7/00*

U.S. Cl. 134—6 **14 Claims**

1. A method of absorbing an aqueous or saline solution using a biodegradable synthetic sponge composition comprising the steps of:

providing said synthetic sponge composition in a substantially unhydrated form, said synthetic sponge composition containing a carboxylic acid with a substantial hydrophobic region, a separate cross-linking agent, and a branched complex carbohydrate;

contacting said solution to be absorbed with said synthetic sponge composition;

whereby said synthetic sponge composition hydrates to absorb said solution and cross-links into a gel substantially simultaneously.

5,073,203

METHOD FOR RECYCLING POLYETHYLENE TEREPHTHALATE (PET) BEVERAGE BOTTLES BY TREATING WITH CARBON DIOXIDE

Hussain A. Al-Ghatta, Fiuggi, Italy, assignor to Cobarr SpA, Anagni, Italy

Filed Oct. 31, 1990, Ser. No. 607,184

Claims priority, application Italy, Nov. 8, 1989, 67980 A89

Int. Cl.[5] B08B *5/00*

U.S. Cl. 134—11 **2 Claims**

1. A method for recycling food packagings made of polymer materials, particularly for recycling polyethyleneterephthalate beverage bottles, comprising:

introducing contaminated recycled polyethyleneterephthalate material into an autoclave; and

treating said polyethyleneterephthalate material in said autoclave in an atmosphere containing carbon dioxide at a pressure greater than 50 bars and a temperature greater than 31° C.

5,073,204

HOT REMOVAL PROCESS FOR ASBESTOS INSULATION

David R. Herwander, St. Albert, Canada, assignor to Fuller Austin Insulation Inc., Edmonton, Canada

Filed Jun. 8, 1990, Ser. No. 534,955

Int. Cl.[5] B08B *5/04, 9/00*

U.S. Cl. 134—21 **15 Claims**

9. A method for hot removal of a cladded asbestos layer from a hot wall, comprising:

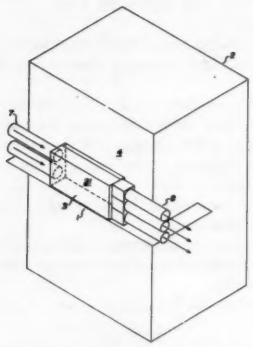
(a) erecting a hoarding assembly having an innermost non-combustible portion sealed against the cladding, said hoarding assembly being adapted to provide an envelope enclosing only a minor portion of the hot wall and defining a work chamber;

(b) providing a fan assembly for injecting a stream of cool air through at least one air supply inlet located at one end of the chamber, said inlets being directed to supply the air stream generally parallel to the wall;

(c) providing second means, having at least one air outlet located at the other end of the chamber, for suctioning air from the chamber and maintaining a negative air pressure within the chamber relative to atmospheric pressure, removing entrained asbestos from the air, and discharing the cleaned air outside the envelope; where the fan assem-

bly air supply inlets are centered about 1 to 3 feet from the cladding; and the second means air outlets are substantially aligned with said inlet so that the air stream moves substantially parallel with the hot wall;

(d) actuating the fan assembly and second means to provide an air stream moving through the chamber, said air being supplied and withdrawn at a sufficient rate to ensure that the temperature about 2 feet from the wall remains below about 80° WBGT;



(e) removing at least part of the enclosed cladding;

(f) removing a narrow strip of the exposed asbestos, on a dry basis, said strip being only a minor portion of the enclosed asbestos;

(g) covering the exposed strip of bared wall with a removable insulating member; and

(h) repeating steps (f) and (g) to gradually remove the exposed asbestos.

5,073,205

METHOD FOR DETACKIFICATION OF PAINT STRAY OPERATION WASTES

Lewis D. Morse, Pittsburgh, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed May 2, 1991, Ser. No. 694,701
Int. Cl.[5] B08B *3/04, 3/08*
U.S. Cl. 134—38 **4 Claims**

1. A method for detackifying over-sprayed paint which contacts and is captured by water circulating in a paint spray booth operation, which comprises adding to said circulating water an effective amount of a copolymer of N-methylolacrylamide and methyldiallylamine to reduce the tackiness of paint, lacquer or enamel solids and to condition the solids so that they can readily be separated from the water.

5,073,206

METHOD OF CLEANING USING AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHLORO-1-FLUOROETHANE, METHANOL AND NITROMETHANE

David P. Wilson; Ian R. Shankland, both of Williamsville, and Earl A. E. Lund, West Seneca, all of N.Y., assignors to Allied-Signal Inc., Morristown, N.Y.

Filed Mar. 7, 1990, Ser. No. 490,024
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.
Int. Cl.[5] B08B *3/08;* **C11D** *7/32, 7/50*
U.S. Cl. 134—40 **8 Claims**

1. A method of cleaning a solid surface which comprises spraying said surface with azeotrope-like compositions comprising from about 93.0 to about 98.0 weight percent 1,1-dichloro-1-fluoroethane, from about 7 to about 2 weight percent methanol, and from about 0.1 to about 0.01 weight percent nitromethane by using a propellant.

5,073,207

PROCESS FOR OBTAINING MAGNESIUM ALLOYS BY SPRAY DEPOSITION

Jean-François Faure, Voiron; Gilles Nussbaum, and Gilles Regazzoni, both of Grenoble, all of France, assignors to Pechiney Recherche, Courbevoie, France

Filed Aug. 23, 1990, Ser. No. 571,224
Claims priority, application France, Aug. 24, 1989, 89 11356
Int. Cl.[5] C22C *23/02, 23/04*
U.S. Cl. 148—2 **17 Claims**

1. Process for obtaining a magnesium alloy having improved mechanical characteristics, including a breaking load of at least 290 MPa and an elongation at break of at least 5%, comprising spray depositing to form an ingot having a composition, by weight:

Al: 2–9%;
Zn: 0–4%;
Mn: 0–1%,
Ca: 0.5–5%, and
rare earths: 0–4%;

with the following main impurity contents:

Si<0.6%,
Cu<0.2%,
Fe<0.1%,
Ni<0.01%:

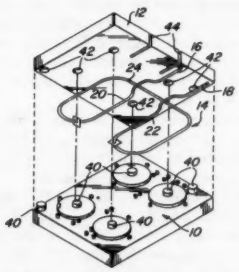
the remainder being magnesium, the cooling rate of said spray depositing being between 10 and 10^3° K./sec, and consolidating said ingot by thermal deformation at between 200° and 350° C.

5,073,208

METHOD FOR CRYOGENIC TREATMENT OF CORIOLIS MASS FLOW METER STRUCTURES

Richard B. Wong, Phoenix, and Wayne Pratt, Scottsdale, both of Ariz., assignors to K-Flow Corporation, Millville, N.J.

Filed Sep. 14, 1989, Ser. No. 407,390
Int. Cl.[5] C21D *8/10;* **G01F** *1/84*
U.S. Cl. 148—11.5 R **18 Claims**



1. A method of treating structures of a Coriolis mass flow meter, including a flow tube comprising the steps of: bending the flow tube of the Coriolis mass flow meter into a desired shape, fixing related flow meter elements onto the flow tube, annealing the bent flow tube and cryogenically cooling the bent and annealed flow tube, thereby relieving internal and residual stress within the flow tube material.

5,073,209

PROCESS EMBODIMENTS FOR IMPROVING THE ELECTRICAL PROPERTIES OF CONDUCTORS

Dominic J. Giancola, 12 Cameron Ct., Princeton, N.J. 08540

Filed Sep. 16, 1987, Ser. No. 97,175
Int. Cl.[5] C21F *1/00*
U.S. Cl. 148—13 16 Claims

1. A process which comprises heating an inorganic conductor with a measured electrical resistivity to provide a physical state characterized by lattice deformation and atomic rearrangement, applying an external field to the heated conductor to induce a zone of higher average electron density than that of the conductor medium, and cooling the said conductor to ambient temperature while maintaining the induced electron density zone; wherein the conductor exhibits a decreased resistivity after the process treatment.

5,073,210

METHOD OF MAKING ELECTRICAL CONDUCTORS

Giles Humpston, Herts, and David M. Jacobson, Middlesex, both of United Kingdom, assignors to The General Electric Company, p.l.c., England

Filed May 22, 1990, Ser. No. 527,050
Claims priority, application United Kingdom, May 26, 1989, 8912138
Int. Cl.[5] C22F *1/02;* C22C *5/02*
U.S. Cl. 148—11.5 R 11 Claims

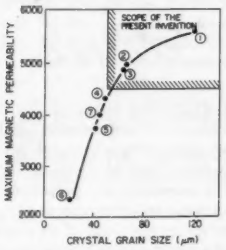
1. A method of making material in the form of a fine wire or thin strip or sheet suitable for use as electrical conductors comprising the steps of forming an ingot substantially consisting of an alloy of gold and at least one of the metals titanium, lutetium, zirconium, scandium and hafnium, the amount of each of said at least one of the metals in the alloy lying in the range from substantially 0.1 at% to an upper limit comprising the atomic percentage of that metal corresponding to the maximum solubility of that metal in the alloy; solution heat treating the ingot and then quenching the ingot from the solution heat treatment temperature; mechanically working the ingot to have a maximum dimension in at least one direction not greater than 250 μm; and heat treating the resulting material at a temperature below its solvus temperature in an ambient atmosphere containing at least one of oxygen and nitrogen to produce a reaction produce precipitate with at least one of oxygen and nitrogen from the ambient atmosphere.

5,073,211

METHOD FOR MANUFACTURING STEEL ARTICLE HAVING HIGH MAGNETIC PERMEABILITY AND LOW COERCIVE FORCE

Kazuaki Matsumoto; Toshimichi Omori; Tetsuya Sanpei, and Hisatoshi Tagawa, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Continuation of Ser. No. 356,771, May 24, 1989, abandoned. This application Mar. 14, 1990, Ser. No. 494,809
Claims priority, application Japan, Jun. 30, 1988, 63-163717
Int. Cl.[5] H01F *1/00*
U.S. Cl. 148—120 4 Claims



1. A method manufacturing a steel article having a high magnetic permeability and a low coercive force, comprising the steps of:

providing a steel consisting essentially of:

carbon: from 0.02 to 0.08 wt. %

manganese: from 0.05 to 0.49 wt. % and

the balance iron and incidental impurities; the contents of silicon, aluminum and nitrogen as said incidental impurities are up to 0.10 wt. % for silicon,

up to 0.02 wt. % for aluminum, and

up to 0.004 wt. % for nitrogen;

heating said steel to a temperature of at least 1,000° C.; then

hot-working said heated steel at a finishing temperature of at least 1,000° C. to form a steel article; and then

cooling said steel article to a temperature of up to 500° C. at a cooling rate of up to 0.5° C./second;

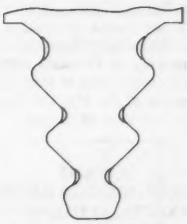
thereby causing crystal grains of said steel article to grow to a grain size of at least 50 μm to impart a high magnetic permeability and a low coercive force to said steel article.

5,073,212

METHOD OF SURFACE HARDENING OF TURBINE BLADES AND THE LIKE WITH HIGH ENERGY THERMAL PULSES, AND RESULTING PRODUCT

Richard L. Fröhlich, San Jose, Calif., assignor to Westinghouse electric Corp., Pittsburgh, Pa.

Filed Dec. 29, 1989, Ser. No. 458,930
Int. Cl.[5] C21D *1/06, 10/00;* C22C *38/18, 14/00*
U.S. Cl. 148—152 3 Claims



1. A process for improving the fatigue and stress resistance of a workpiece made of a transformation hardenable metal selected from the alloy series groups Fe-C, Fe-30%Ni, Fe-12%Cr, and titanium based, comprising the steps of:

pulsing a preselected area of said workpiece with thermal energy in the substantial absence of carbonaceous material to prevent melting of the metal and absorption of carbon into the same and yet a localized martensitic reaction at said preselected area is caused to provide a hardened area having compressive stress.

5,073,213

PROCESS FOR APPLYING A PHOSPHATE SLIDING LAYER TO A BEARING METAL LAYER

Harald Pfestorf, Untereisesheim, Fed. Rep. of Germany, assignor to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed May 18, 1990, Ser. No. 525,506
Claims priority, application Fed. Rep. of Germany, May 20, 1989, 3916498
Int. Cl.[5] C23C *22/00*
U.S. Cl. 148—262 9 Claims

1. A process of applying a phosphate sliding layer having a thickness of 0.5 to 10 μm to the outside surface of a bearing metal layer by contacting with an aqueous phosphating solution comprising

1.5 to 5.0 g/l Zn

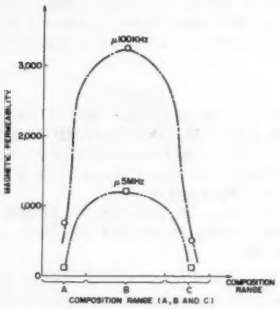
12 to 24 g/l Na

11 to 22 g/l P_2O_5

17 to 33 g/l NO_3

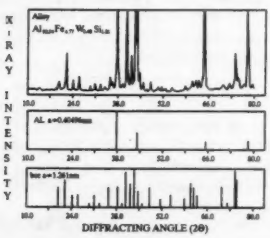
16 to 30 g/l BF_4
20 to 39 g/l $B(OH)_3$
1.0 to 6.0 g/l NaF.

5,073,214
MAGNETIC MATERIAL FOR A MAGNETIC HEAD
Ken Hirota, Toyonaka; Mitsuo Satomi, Katano, and Koichi Kugimiya, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 20, 1989, Ser. No. 424,728
Claims priority, application Japan, Oct. 26, 1988, 63-269904
Int. Cl.[5] C22C *38/02, 38/06*
U.S. Cl. 148—306 **6 Claims**



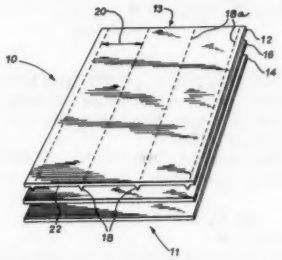
4. A magnetic head having a magnetic core made of a magnetic material comprising an Fe-based alloy consisting essentially of Fe as a main component, at least one element selected from a group consisting of Be, Mg, Ca, Sr, Ba, Sc, Y, Nb, Ta and Hf, and 0.005 to 1.5 wt% of oxygen.

5,073,215
ALUMINUM IRON SILICON BASED, ELEVATED TEMPERATURE, ALUMINUM ALLOYS
David J. Skinner, and Michael S. Zedalis, both of Morris, N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.
Filed Jul. 6, 1990, Ser. No. 549,025
Int. Cl.[5] C22C *21/14*
U.S. Cl. 148—415 **2 Claims**



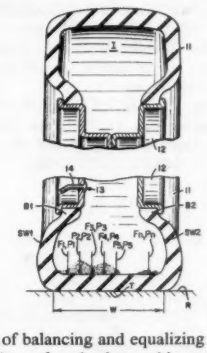
1. A rapidly solidified aluminum base alloy consisting essentially of the formula $Al_{bal}Fe_aSi_bX_c$, wherein X is at least one element selected from the group consisting of W, Ta, Nb, "a" ranges from 3.0 to 7.1 at %, "b" ranges from 1.0 to 3.0 at %, "c" ranges from 0.25 to 1.25 at % and the balance is aluminum plus incidental impurities, with the provisos that the ratio [Fe+X]:Si ranges from about 2.33:1 to 3.33:1 and that the ration Fe:X ranges from about 16:1 to 5:1, said alloy having an aluminum solid solution phase containing therein a substantially uniform distribution of dispersed quaternary silicide intermetallic phase precipitates, each of said precipitates being of approximate composition $Al_{13}[Fe,X]_3Si$, measuring less than about 100 nm in any dimension thereof and having a cubic structure.

5,073,216
METHOD OF ULTRASONICALLY CUTTING FIBROUS MATERIALS AND DEVICE THEREFROM
Neal A. Siegel, Deerfield; Edward S. Tripp, Park City; Diane L. Aunet, Waukegan, and Gradimir G. Georgevich, Mundelein, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.
Filed Apr. 7, 1989, Ser. No. 335,006
Int. Cl.[5] B32B *31/18*
U.S. Cl. 156—73.3 **13 Claims**



1. A method of cutting of fibrous material comprising the steps of:
(a) chemically modifying the fibrous material by treating the fibrous material with an oxidizing agent or a hydrolyzing agent under conditions effective to render the material is cuttability by ultrasonic energy facile; and
(b) directing ultrasonic energy through the chemically modified fibrous material along a selected line of cut.

5,073,217
METHOD OF BALANCING A VEHICLE WHEEL ASSEMBLY
Robert D. Fogal, 15 Kenwood Rd., Chambersburg, Pa. 17201
Filed Oct. 17, 1990, Ser. No. 599,776
Int. Cl.[5] B60C *19/00;* **G01M** *1/30;* **F16F** *15/36*
U.S. Cl. 156—75 **24 Claims**



22. A method of balancing and equalizing radial and lateral load force variations of a wheel assembly comprising the steps of providing a wheel assembly which includes a tire in a range substantially between 13" and 24.5" size, providing pulverulent material consisting essentially of a polymeric resin and cellulose in a range substantially between 8–200 screen size, and placing a selected screen size range of the pulverulent material in the absence of a liquid carrier in free movable relationship into the tire in a weight range substantially between ½ ounce to

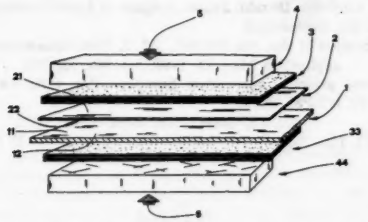
24 ounces for the tire size ranges of substantially between 13" to 24.5" size, rotating the wheel assembly, and subjecting the wheel assembly during the rotation thereof to impact forces which move the pulverulent material to positions at which the pulverulent material balances and equalizes radial and lateral force variations of the wheel assembly.

5,073,218

METHOD OF TRANSFERRING A TONER IMAGE TO A SUBSTRATE

Giordano Aggio, Modena, Italy, assignor to Calco Cloth S.R.L., Modena, Italy

Filed Mar. 27, 1990, Ser. No. 500,009
Claims priority, application Italy, May 12, 1989, 40075 A/89
Int. Cl.[5] B44C *1/175;* B41M *5/04*
U.S. Cl. 156—230 6 Claims



1. A method for transferring a toner image prepared by a conventional photocopy process from a paper substrate to a substrate of fabric, leather or other material comprising the following steps:

producing a toner image on a sheet of paper (2) by conventional photocopy means;

placing the sheet of paper (2) directly over the material (1) to be printed, with the surface (22) of the sheet bearing the image directly over the surface (11) of the substrate destined to receive the image;

protecting at least one exposed surface of paper (2) and material (1) with an elastically deformable, heat resistant backing layer (3, 33) of uniform thickness;

hot-pressing the layers by application of a force directed perpendicularly to their surfaces for a given duration at a given pressure and temperature to fuse the surface (22) of the sheet bearing the image with the surface (11) of the substrate receiving the image;

separating the backing layer (3, 33) from the paper (2) and material (1);

applying solvent under gentle pressure to the exposed surface (21) of the sheet paper (2), still fused to the material (1), to the end of facilitating separation of the toner or ink from the sheet;

lifting the sheet (2) from the material (1);

fixing the printed image which appears on the material (1).

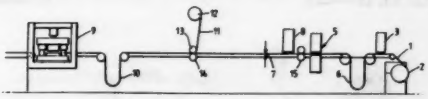
5,073,219

METHOD OF AND APPARATUS FOR MAKING OPTICAL STORAGE DEVICES

Ciaran B. McArdle, Dublin, Ireland; Michael G. Clark, Gerrards Cross, England; William R. Beck, Wooddale, Ill., and Carolyn Bowry, Wembley, England, assignors to The General Electric Company, p.l.c., England

PCT No. PCT/GB89/00173, § 371 Date Dec. 11, 1989, § 102(e) Date Dec. 11, 1989, PCT Pub. No. WO89/07821, PCT Pub. Date Aug. 24, 1989
PCT Filed Feb. 17, 1989, Ser. No. 424,256
Claims priority, application United Kingdom, Feb. 19, 1988, 8803923
Int. Cl.[5] B32B *31/12;* G02F *1/1337*
U.S. Cl. 156—242 40 Claims

1. A process for the manufacture of a plurality of optical storage sheets, comprising the steps of providing an elongate flexible substrate; forming an elongate film of a liquid crystalline material on said substrate; feeding said substrate with said film thereon lengthwise along a path from a first location to a second location whereby areas of the film are fed successively past aligning means positioned between said first and second



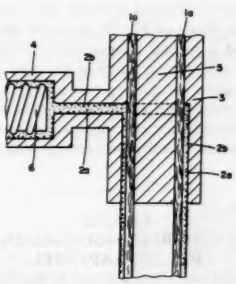
locations, the aligning means being operative to apply a field to each successive area of the film to align molecules of the liquid crystalline material in each said area; and cutting the substrate with said film thereon into portions, each forming an optical storage sheet.

5,073,220

METHOD FOR PRODUCING A GRIPPING STICK

Yoshio Midorikawa, Tokyo, Japan, assignor to Tohyo Porimah Kabushikigaisha, Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 336,810
Claims priority, application Japan, Apr. 23, 1988, 63-99331
Int. Cl.[5] B29C *47/06*
U.S. Cl. 156—244.11 3 Claims



1. A method for producing a gripping stick in which a skin layer is laminated on a substrate formed of high melting point high-density polyolefin resin, the method comprising the steps of:

feeding high melting point high-density polyolefin resin into a extrusion die to form a substrate,

feeding a mixture of low melting point low-density polyolefin resin powder and high melting point high-density polyolefin resin powder into said extrusion die around said substrate to envelop the outside of said substrate in said extrusion die,

heating said enveloped substrate to a temperature higher than the melting point of the low melting point low-density polyolefin resin but lower than the melting point of said high-density density polyolefin resin, gelling the low melting point low-density polyolefin resin to form a layer around said substrate, extruding said layered substrate from said extrusion die whereby said low melting point low density polyolefin resin forms into an elastomer,

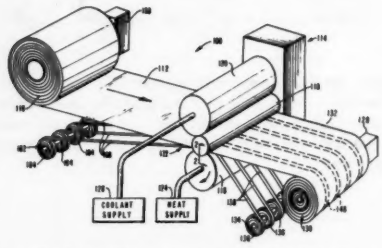
and said high melting point high-density polyolefin resin in said layer, remains in the form of solid particles at the outer edge of the elastomer.

5,073,221

APPARATUS AND PROCESS OF MAKING MAGNETICALLY READABLE CARDS

Robert R. Waitts, West Caldwell, and Jeffrey P. St. Thomas, Ramsey, both of N.J., assignors to Crown Roll Leaf, Inc., Paterson, N.J.

Filed Nov. 22, 1989, Ser. No. 440,976
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—253 12 Claims



1. A method of making composite material including a sheet of plastic material having at lest one layer of magnetic material thereon, said method comprising the steps of advancing a sheet of plastic material towards a nip formed by a heated first roller juxtaposed with a second roller, advancing a layer of magnetic material towards said nip in registration with said sheet of plastic material, bonding said layer of magnetic material to said sheet of plastic material by application of heat and pressure thereto within said nip to form said composite material, said bonding comprising contacting said layer of magnetic material with said heated first roller and said sheet of plastic material with said second roller with said nip, heating said first roller to a first temperature sufficient to bond said layer of magnetic material to said sheet of plastic material, and cooling said second roller to a second temperature sufficient to prevent deformation of said plastic material by substantial shrinkage thereof, said cooling comprising contacting the outer surface of said second roller with a third roller maintained at a third temperature sufficient for cooling said second roller to said second temperature thereby preventing deformation of said plastic material.

5,073,222

METHOD OF ADHERING HOLOGRAMS TO TEXTILE WEARING APPAREL

David Fry, Creve Coeur, Mo., assignor to Max Scharf, St. Louis, Mo.

Continuation of Ser. No. 214,396, Jul. 1, 1988, Pat. No. 4,956,040. This application Jun. 25, 1990, Ser. No. 543,093
The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.
Int. Cl.[5] B32B *31/00;* A47G *1/12*
U.S. Cl. 156—267 4 Claims

1. A method for adhering articles to textile wearing apparel comprising the steps of:

(a) laminating a precut article having an upper surface and a lower surface between a clear polyester coating on the upper surface of said article and an adhesive skrim backing on the lower surface of said article to envelope the article and protect it from moisture and scuffing, said polyester coating being sealed to said adhesive skrim backing around margins of said backing extending outwardly from said article and said adhesive skrim backing being adapted to adhere said article to textile wearing apparel;

(b) cutting said margins away from the resulting laminated article to form an enveloped article; and

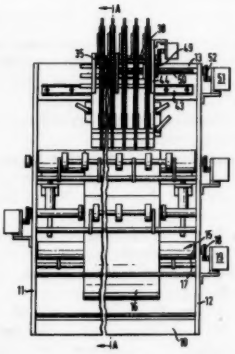
(c) applying the enveloped article to textile wearing apparel at a temperature of approximately 270 to 300° F. and under a pressure of approximately 30 to 50 psi for a period of approximately 8 to 15 seconds whereby said article becomes firmly adhered to said textile wearing apparel.

5,073,223

APPARATUS FOR FORMING A PATTERN OF ARTICLES ON A SUBSTRATE

Akira Kurihara, Isezaki, Japan, assignor to Jakob Schlaepfer & Co. AG, Switzerland

Continuation of Ser. No. 885,607, Jul. 7, 1986, abandoned. This application Mar. 23, 1989, Ser. No. 328,740
Claims priority, application European Pat. Off., Oct. 31, 1985, PCT/EP85/00580.
Int. Cl.[5] B44C *3/00;* B65C *9/18*
U.S. Cl. 156—362 17 Claims



1. A transfer apparatus for forming a pattern of articles on a substrate having a length and a width, said apparatus comprising:

means for advancing a longitudinal length of substrate material along a substrate path,

a transfer station comprising a plurality of transfer heads extending transversely with respect to said path, each transfer head being movable to any position in the transverse direction within the width of the substrate, each transfer head being adapted to transfer articles directly to said substrate,

magazine means associated with and movable with each said transfer head to sequentially supply said articles directly from said tape to said substrate, each said magazine means including a perforated tape carrying a plurality of said articles thereon at a predetermined spacing, each adhesively affixed at a perforation, for transfer directly from said tape to said substrate; and

control means for controlling the supply of articles from said magazine means, longitudinal movement of the substrate, and transverse movement of the transfer heads, thereby to control relative movement between the substrate and the transfer heads at the point at which each article is transferred from the respective tape to the substrate,

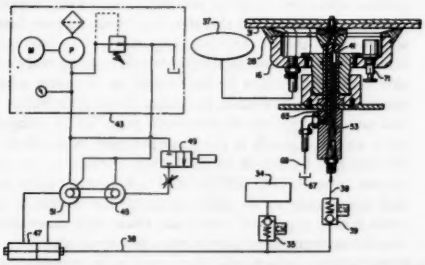
said articles being transferred by pressure applied by pressing means at or about each successive perforation.

5,073,224

APPARATUS FOR INJECTING A CHEMICAL BARRIER INTO A SURFACE APERTURE

Mark K. Addison; William F. Campbell, both of Fort Worth, and Ralph J. Panno, Grapevine, all of Tex., assignors to General Dynamics Corporation, Fort Worth, Tex.

Filed Oct. 26, 1989, Ser. No. 427,607
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—382 21 Claims



11. An injection apparatus for use in injecting a fluid medium into a location at a work site, said apparatus comprising:

a. injector means for injecting said medium into said work site location, said injector means having an end that is adapted to be located adjacent to said work site, said injector means having a first channel extending away from a first channel opening that is located at said end, said first channel being adapted to convey pressurized medium to said work site, said injector means having a second channel extending away from a second channel opening that is located at said end, said second channel being adapted to convey unused medium away from said work site, said injector means having seal means at said end, said seal means being adapted to contact said work site and provide a seal around said first and second channel openings;

b. storage means for storing a supply of said medium, said storage means being connected to said first channel;

c. retaining means for retaining said injector means to said work site while said medium is being injected, said retaining means being coupled to said injector means and being releasable such that said injector means can be removed from said work site, said injection of said medium into said work site producing a force of injection, said retaining means being capable of withstanding said injection force;

d. pressurizing means for pressurizing said medium in said first channel to an injection pressure such that said medium in said first channel is injected into said work site location, said pressurizing means being connected to said first channel, said pressurizing means providing pulsed pressurization of said medium in said first channel, wherein high pulsed pressures can be utilized in injecting said medium in said first channel while minimizing said injection force acting on said retaining means.

5,073,225

FIRST STAGE TIRE BUILDING MACHINE INCLUDING SELECTIVELY COUPLED BEAD SETTERS AND BLADDER CAGES

Larry D. Schmitt, and David W. Bailey, both of Ontario, Canada, assignors to The Uniroyal Goodrich Tire Company, Akron, Ohio

Filed Mar. 2, 1989, Ser. No. 317,874
Int. Cl.[5] B29D *30/32*
U.S. Cl. 156—401 3 Claims

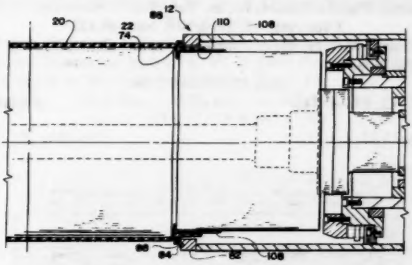
1. A machine for fabricating tire carcasses comprising in combination:

a rotatable main drum upon which ply material is laid up;

auxiliary drums of a reduced diameter axially aligned at the ends of the main drum to define therebetween a step for the placement of bead rings;

magnetic bead setters reciprocable from retracted positions axially exterior of the main and auxiliary drums and advanced positions to move magnetically supported bead rings to the step between the drums;

bladders positionable between radially interior and exterior positions with regard to main drum whereby their inflation will turn up the edges of the ply material to encompass the bead rings at the steps and fabricate the tire carcass;



bladder cages reciprocable to guide the inflation of bladders;

a single, common drive means to reciprocate each bladder cage between the retracted and advanced positions; and

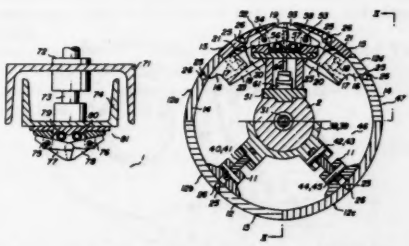
means to selectively couple and uncouple the bladder cages and bead setters whereby the bead setters may reciprocate concurrently with the bladder cages during the bead setting and the bladder cages may reciprocate independently of the bead setters during edge turn up.

5,073,226

CYLINDRICAL MEMBER FORMING APPARATUS

Shoujyu Suzuki, and Yutaka Takasuga, both of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 12, 1990, Ser. No. 580,997
Claims priority, application Japan, Sep. 12, 1989, 1-236710
Int. Cl.[5] B29D *30/24;* G03D *15/04*
U.S. Cl. 156—417 9 Claims



1. An apparatus for forming an endless or cylindrical member from a belt shaped member, comprising a forming drum having a cylindrical unit composed of a plurality of arcuate segments radially movable for changing the outer diameter of the cylindrical unit, having a slit in the cylindrical unit extending in an axial direction of the cylindrical unit between two adjacent arcuate segments, wherein each of the said two adjacent segments are rockably hinged to respective other arcuate segments, means for winding the belt-shaped member around the cylindrical unit such that a slight clearance between the ends of the belt-shaped member is aligned with the slit of the cylindrical unit, a first joining unit arranged inside the forming drum and aligned with the slit, a second joining unit arranged outside the forming drum and movable toward and away from the first joining unit when the second joining unit is in align-

ment with the slit for pulling closer together the inside and outside of the ends of the belt-shaped member wound around the cylindrical unit and butt joining the ends in cooperation with the first joining unit, and diameter changing means for moving the arcuate segments in the radial direction of the cylindrical unit to increase and decrease its diameter.

5,073,227

MOISTENING DEVICE FOR ENVELOPE FLAPS

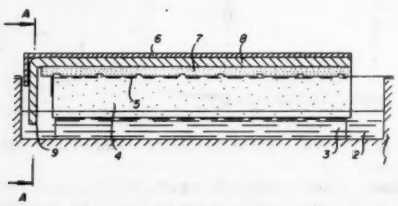
Heinz Rehberg, Berlin, Fed. Rep. of Germany, assignor to Francotyp-Postalia GmbH, Berlin, Fed. Rep. of Germany

Filed Aug. 16, 1990, Ser. No. 568,422

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1989, 3928307

Int. Cl.[5] B43M *1/00*

U.S. Cl. 156—441.5 **5 Claims**



1. Moistening device for the application of a liquid to gummed surfaces of envelope or letter flaps, comprising a reservoir for liquid, a support, a sponge disposed on said support, a brush holder resiliently disposed above said reservoir, a brush being held by said brush holder and having bristles resting on said sponge for soaking with the liquid, and an absorptive strip disposed above said brush for storage of the liquid.

5,073,228

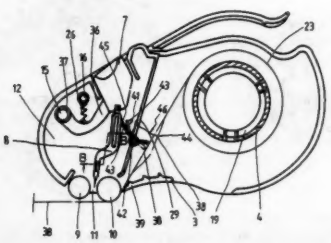
STRUCTURE OF A CARTON SEALING STICKER AND CUTTER

Shuh-Chin Lin, No. 5, 35th Alley, 4th Lane, An-Lo Rd., Chung-Ho City, Taipei, Taiwan

Filed Aug. 13, 1990, Ser. No. 566,578

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—523 **1 Claim**



1. The improved structure of a carton sealing sticker and cutter, comprising:

a housing body comprising a basic frame and a cover, said basic frame comprising an arcuate front part with a mount hole on the upper wall thereof for mounting of a press button of cutter device, a vacancy in the lower part for locally extending a front and a back roller therefrom and the inside of the two side walls provided with slideways, a pivot and a suspension bar therebetween to link said cutter device; a partition board dividing the frame into a front and back area; a guide plate arranged behind said vacancy; in the central area of the back side wall, a connection base of a tape sleeve ring comprising a hollow short barrel provided with three resilient hooks on its peripherial walls thereof to meet with catch holes of the barrel seat of said tape sleeve ring upon engagement;

a cutter device comprising a blade, a blade seat, a blade support, a press button and an extensible spring connected between two side walls of said basic frame front part wherein said blade is aimed at the gap of between said front and back rollers; said blade being a little bit wider than tape with a cone-shaped cutting edge and joined to said blade seat by inserting its upper half part into an offering flute provided in said blade seat lower half part; said blade seat being a flat jacket with a groove in its upper part in which the flange of end part of said blade support inserts to be connected thereby; said blade support being somewhat U-shaped with packing plates on its two sides which insert into said slideways on said housing body two side walls and buckles on the ends of its two sides which insert sockets provided on two sides of said press button to link and position them thereby; said press button comprising a suspension arm in the front part and an axis hole at the top end by which to be pivoted on said pivot connected between two side walls of said housing front part and being hung up by said suspension bar so that if said press button is pressed down, said blade may move down too but retreats immediately upon release of it;

a safety device pivoted on a pivot pin in said partition board and comprising an operation board, a torsional spring and a raised part on the back of said blade support; said operation board having a central pivot hole to sleeve said pivot pin; said torsional spring which too sleeves said pivot pin having one arm of itself resist against the front part of said partition board and the other arm against the front part of said operation board to enable said operation board to counter-balance beneath said raised part of said blade support to prevent downward movement of said blade; said operation board's rear part extending into said housing body back area wherein the tape when tightened may contact the rear end of said operation board and the generated friction force therebetween thus may force the front end of said opertion board to depart from said raised part of said blade support;

a guide plate being slightly arcuate in shape and arranged behind said vacancy and provided with raised edges for guiding tape delivery;

a tape sleeve ring being a hollow barrel one end of which is perpendicularly connected to the inner wall of said cover and, on the barrel body peripherial walls, comprising a few resilient pieces slightly outward developed and catch holes to which said three resilient hooks provided on said connection base of said housing body's back side wall are engaged in order for tape roll to sleeve thereon, and covered by said cover;

with the above-described elements, this improved carton sealing sticker and cutter may overcome shortcomings of the conventionally used device.

5,073,229

SEMICONDUCTOR CRYSTAL PULLING METHOD

Youji Yamashita, Yokohama, and Masakatu Kojima, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 314,857, Feb. 24, 1989, abandoned. This application Jun. 29, 1990, Ser. No. 545,098

Claims priority, application Japan, Feb. 25, 1988, 63-42583

Int. Cl.[5] C30B *15/12*

U.S. Cl. 156—605 **15 Claims**

1. A crystal pulling method comprising the steps of:

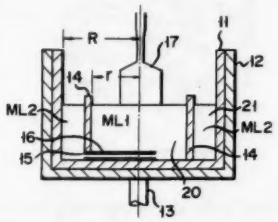
coaxially disposing a separation wall in a semiconductor crystal pulling quartz crucible to divide said crucible into an inner chamber and an outer chamber;

putting a first silicon material melt into said inner chamber and second silicon material melt into said outer chamber;

doping said first silicon material melt with phosphorus; and

pulling phosphorus-doped N-type high resistance single crystal silicon from the first silicon material melt in said inner chamber while the second silicon material melt in said outer chamber is being supplied to said inner chamber, via coupling means for connecting said inner chamber and outer chamber with each other and suppressing an outflow of impurity from said inner chamber to said outer chamber;

wherein the second silicon material melt in said outer chamber is undoped melt; and a condition of $0.80 \geqq \sqrt{Si}/(\sqrt{Si}+\sqrt{So}) \geqq 0.65$ is set to increase the concentration of



phosphorus in a longitudinal direction of the crystal and compensate for or cancel influence by conductive impurity which has flowed out of the crucible and mixed into the first silicon material melt, thus controlling the resistivity of the pulling crystal in the longitudinal direction thereof, where Si is the area of the upper surface of melt in said inner chamber, and So is the area of the upper surface of melt in said outer chamber,

wherein the resistivity in a longitudinal direction of said phosphorus-doped N-type high resistance silicon single crystal is more than 20 Ω.cm.

5,073,230

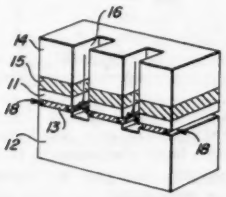
MEANS AND METHODS OF LIFTING AND RELOCATING AN EPITAXIAL DEVICE LAYER

George N. Maracas, Tempe; Ronald A. Ruechner, Mesa, and Donald S. Gerber, Scottsdale, all of Ariz., assignors to Arizona Board of Regents acting on behalf of Arizona State University, Tempe, Ariz.

Filed Apr. 17, 1990, Ser. No. 510,276

Int. Cl.[5] H01L *21/00*

U.S. Cl. 156—631 **27 Claims**



25. A process for selectively freeing without curling an epitaxial layer from an original substrate upon which it was grown having a release layer of AlAs operatively interposed therebetween, and transferring said epitaxial layer to a new substrate, said process comprising the steps of: placing a layer of positive photoresist as a temporary adhesive over the epitaxial layer selected from the group consisting of GaAs, $Al_xGa_{1-x}As$ and AlAs; placing upon said temporary adhesive layer a planar rigid silicon wafer support wafer support mask having holes strategically defined therein; extending said holes in said support mask downwardly through said temporary adhesive layer, said eiptaxial layer, and said release layer; directing an etchant comprising hydrofluoric acid and water in a ratio of from about 1:5 to about 1:20 into said original substrate through said extended holes to engage and eliminate said release layer from between said eiptaxial layer and said substrate; raising said rigid support mask having said epitaxial layer secured thereto by said temporary adhesive to separate said epitaxial layer secured thereto by said original substrate; positioning said rigid support mask n alignment over a new substrate; securing said epitaxial layer to said substrate, and removing said support means and said temporary adhesive from said transplanted eiptaxial layer.

5,073,231

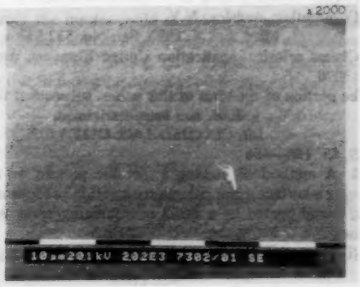
METHOD FOR PRODUCING SMOOTH SURFACES ON PLASTICS

Manfred Eschwey, Düsseldorf; Rolf van Bonn, Duisburg, and Horst Neumann, Kelkheim, all of Fed. Rep. of Germany, assignors to MG Industries, Valley Forge, Pa.

Filed Sep. 7, 1990, Ser. No. 578,394

Int. Cl.[5] B44C *1/22;* **B29C** *37/00*

U.S. Cl. 156—646 **16 Claims**



1. A process for producing a smooth surface on an object made of a polymer of ethylene, propylene, butadiene, or polystyrene, the process comprising the step of exposing the object to a gas mixture containing fluorine and a gaseous oxidizing agent.

5,073,232

METHOD OF ANHYDROUS HYDROGEN FLUORIDE ETCHING

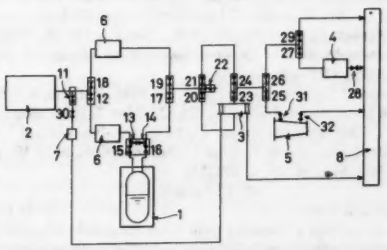
Tadahiro Ohmi, Sendai; Masahiro Miki, Osaka; Hirohisa Kikuyama, Nara, and Matagoro Maeno, Osaka, all of Japan, assignors to Hashimoto Chemical Industries Co., Ltd., Osaka, Japan

Division of Ser. No. 381,913, Jul. 19, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 454,575

Claims priority, application Japan, Jul. 20, 1988, 63-181224; Jul. 20, 1988, 63-181226

Int. Cl.[5] H01L *21/306*

U.S. Cl. 156—646 **2 Claims**



1. A method for etching at least one of a plurality of films formed on a surface of a substrate comprising the steps of:

providing said substrate without moisture in a chamber without moisture, said substrate having at least one of said films formed on a surface thereof;

continuously supplying an anhydrous inert gas to said substrate;

cooling a source of liquified anhydrous hydrogen fluoride so as to provide an anhydrous hydrogen fluoride gas, diluting said anhydrous hydrogen fluoride gas so as to provide a diluted anhydrous hydrogen fluoride gas and

supplying said diluted anhydrous hydrogen fluoride gas to the surface of the substrate during at least a portion of the period of continuously supplying said an anhydrous inert gas to said substrate, for a sufficient time so as to etch said at least one of said films wherein said diluted anhydrous hydrogen fluoride contains between 0.001 to 0.3 vppm water vapor.

5,073,233

METHOD OF MAKING A METALLIC PATTERN ON A SUBSTRATE

Christopher P. Banks, Saffron Walden, and Edward Irving, Higher Whitley, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 4, 1990, Ser. No. 532,533

Claims priority, application United Kingdom, Jun. 7, 1989, 8913090

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.[5] C25D *5/48;* **C23F** *1/02*

U.S. Cl. 156—656 **19 Claims**

1. A method of making a metallic pattern on a substrate having a surface comprising bare metal in predetermined areas and metal coated by a resist in remaining areas which comprises

(i) protecting the bare metal by electrodepositing thereon a film of an organic resin,

(ii) immersing the substrate bearing the electrodeposited resin film in an aqueous solution or dispersion of a hardening agent for said film, said hardening agent being a material which is curable, either alone or through reaction with functional groups in the electrodeposited resin film, on heating or irradiation, whereby said aqueous solution or dispersion diffuses into the surface of the electrodeposited resin film,

(iii) subjecting the substrate to curing conditions for the hardening agent, thereby hardening the surface of the electrodeposited resin film and rendering it resistant to a solvent used to remove the resist and resistant to an etchant used to remove metal from areas exposed by removal of the resist,

(iv) removing the resist from said remaining areas using a solvent which does not remove the electrodeposited resin film, and

(v) etching metal exposed in step (iv) using an etchant which does not remove the electrodeposited resin film.

5,073,234

COMPOSITION AND METHOD OF DEINKING OF RECYCLED CELLULOSIC MATERIAL

Christopher C. Mollett, Brighton, and Gordon R. Sneddon, Farncombe, both of England, assignors to Albright & Wilson Limited, Oldbury, England

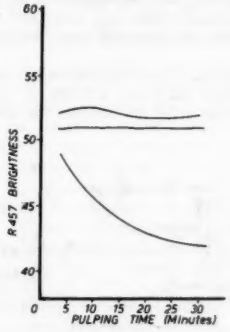
Division of Ser. No. 28,017, Mar. 18, 1987, Pat. No. 4,919,754, which is a division of Ser. No. 731,527, May 7, 1985, abandoned. This application Jan. 12, 1990, Ser. No. 464,341

Claims priority, application United Kingdom, May 10, 1984, 8411888; Aug. 24, 1984, 8421546

Int. Cl.[5] D21C *5/02*

U.S. Cl. 162—5 **24 Claims**

1. A method of making pulp from recycled cellulosic pulp material contaminated with print, which comprises macerating the material in an aqueous dispersion containing a fluid, non-fiber-substantive, resin precursor which is curable in the dispersion, the resin precursor consisting essentially of a mixture of a fluid prepolymer having at least two reactive functional groups per molecule and a cross-linking agent capable of reacting with the functional groups, the resin precursor being present in an amount effective to facilitate subsequent de-inking of



the contaminated pulp, curing said resin precursor and agglomerating print with said cured resin during said maceration and separating the cured resin from the pulp.

5,073,235

PROCESS FOR CHEMICALLY TREATING PAPERMAKING BELTS

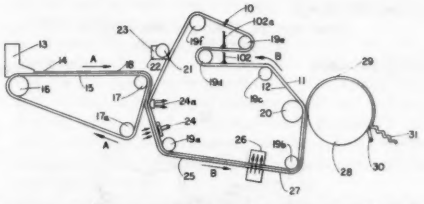
Paul D. Trokhan, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 12, 1990, Ser. No. 508,879

The portion of the term of this patent subsequent to Oct. 22, 2008, has been disclaimed.

Int. Cl.[5] D21F *1/00*

U.S. Cl. 162—199 **12 Claims**



1. A process for extending the life of papermaking belts containing a solid polymeric resin which has been rendered solid by exposing a liquid photosensitive resin to light of an activating wavelength, which process comprises the steps of:

a) providing a papermaking belt, said papermaking belt containing a solid polymeric resin which has been rendered solid by exposing a liquid photosensitive resin to light of an activating wavelength; and

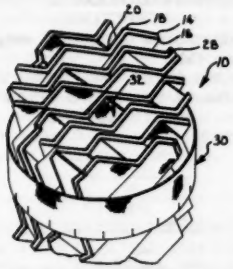
b) continuously applying a release emulsion comprising water, oil, surfactant, and an effective amount of an antioxidant chemical compound capable of inhibiting or retarding the oxidation rate of said solid polymeric resin to the papermaking belt, said release emulsion being continuously applied to the papermaking belt while the belt is being used in a papermaking machine, at a point where the belt is not in contact with a paper web, wherein said antioxidant chemical compound is selected from the group consisting of hindered phenols, secondary amines, and mixtures thereof, and wherein said antioxidant chemical is dissolved in the oil phase of the release emulsion.

5,073,236

PROCESS AND STRUCTURE FOR EFFECTING CATALYTIC REACTIONS IN DISTILLATION STRUCTURE

Abraham P. Gelbein, 9412 Benttree Cir., Wichita, Kans. 67226, and Matt Buchholz, 250 N. Bluff, Wichita, Kans. 67208

Filed Nov. 13, 1989, Ser. No. 434,342
Int. Cl.[5] B01D *3/32;* B01J *8/04*
U.S. Cl. 203—29 14 Claims



11. A process for concurrent catalytic reaction with distillation of fluid streams within a mass transfer column, said process comprising the steps of:

directing a liquid stream over a plurality of pairs of vertically extending vapor permeable plates disposed in closely spaced adjacent pairs, said plurality of plates presenting mass transfer zones for liquid-vapor interaction,

at least one plate of each pair presenting a plurality of catalyst receiving areas while the other plate of the pair cooperates with the firstmentioned plate to retain catalyst in said areas, a particulate catalyst substantially filling at least some of said areas and being retained in an enclosing envelope presented by said plates, each adjacent pair of plates being in contact with at least one adjoining pair to present a plurality of contiguous pairs of said plates;

moving said liquid stream through said particulate catalyst to effect a catalytic reaction;

concurrently distilling a portion of the liquid stream in said column to present a vapor stream;

directing the vapor stream and said liquid stream to said mass transfer zones for interaction; and

withdrawing distillation products from said zones and reaction products from said areas.

5,073,237

METHOD OF MAKING MOLDS FOR ELECTRODEPOSITION FORMING OF MICROSTRUCTURED BODIES

Walter Bacher, Stutensee; Hans Biedermann, Bruchsal, and Michael Harmening, Stutensee, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

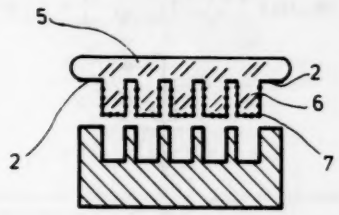
Filed Mar. 20, 1991, Ser. No. 672,421
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1990, 4010669
Int. Cl.[5] C25D *1/08*
U.S. Cl. 264—320 10 Claims

1. A method of making molds with microstructured recesses having a continuous base covered by a film of an electrically conductive material for forming in said recesses, by electrodeposition, microstructured plate-like bodies, said method comprising the steps of:

a) coating a layer of a thermoplastic material with a film of an electrically conductive material,

b) pressing a master mold with a microstructure formed thereon at a temperature which is above the softening temperature of the thermoplastic material through said film of electrically conductive material into said layer of thermoplastic material whereby the front face of said microstructure engages said electrically conductive film and presses a continuous portion thereof into said thermoplastic material layer while the remainder of said electrically conductive film breaks apart into a plurality of isolated spangles,

c) cooling the master mold and thermoplastic material layer to a temperature below the softening point thereof, and



d) removing the master mold thereby providing with said thermoplastic material layer a negative mold with microstructured recesses having said continuous electrically conductive film portion disposed on the base of said recesses.

5,073,238

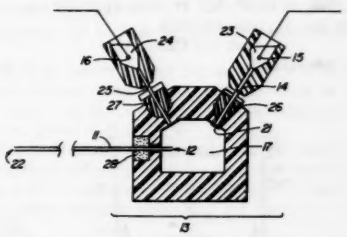
Patent Not Issued For This Number

5,073,239

FLUID INTRODUCTION INTO A CAPILLARY BY ELECTROENDOSMOSIS

Stellan Hjerten, Upsala, Sweden, assignor to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Jan. 24, 1990, Ser. No. 469,640
Int. Cl.[5] G01N *27/26;* B01D *57/02*
U.S. Cl. 204—180.1 21 Claims



1. A method for introducing a selected volume of liquid into a capillary tube in a capillary electrophoretic system, said capillary tube filled with an electrophoretic separation medium, said method comprising:

(a) arranging said capillary tube to open into a body of said liquid and to be in fluid communication with a fluid passage filled with a medium, said fluid passage, said medium or both tending to induce electroendosmotic flow in said fluid passage in the presence of an electric potential, said fluid passage arranged such that electroendosmotic flow so induced therein causes bulk flow in said capillary tube; and

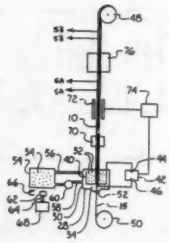
(b) applying an electric potential across said fluid passage without applying an electric potential across said capillary tube, thereby causing electroendosmotic flow in said fluid passage and bulk flow of said electrophoretic separation medium in said capillary tube, until said selected volume of liquid has entered said capillary tube.

5,073,240

ANHYDROUS ELECTROPHORETIC SILVER COATING TECHNIQUE

William A. Raggio, Del Mar; Frederick H. Elsner, Cardiff, and Lawrence D. Woolf, Carlsbad, all of Calif., assignors to General Atomics, San Diego, Calif.

Filed Sep. 21, 1990, Ser. No. 586,001
Int. Cl.[5] C25D *13/00*
U.S. Cl. 204—181.5 17 Claims



1. A process for electrophoretically depositing silver onto a substrate which comprises the steps of:

(a) suspending a plurality of silver particles, each having a surfactant coating, in a solution at a predetermined concentration, said solution containing alcohol;

(b) immersing said substrate in said solution;

(c) positioning an electrode in said solution; and

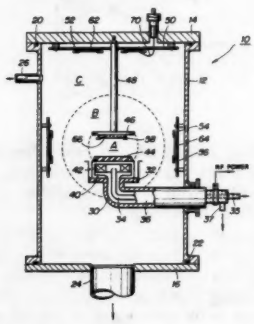
(d) applying a voltage between said substrate and said electrode to electrophoretically deposit said silver particles onto said substrate as said substrate is drawn through said solution.

5,073,241

METHOD FOR CARBON FILM PRODUCTION

Misuzu Watanabe, Kawasaki, Japan, assignor to Kabushiki Kaisha Meidenshae, Tokyo, Japan

Filed Jan. 28, 1987, Ser. No. 7,747
Claims priority, application Japan, Jan. 31, 1986, 61-19566; Jan. 31, 1986, 61-19567; Jan. 31, 1986, 61-19568; Jan. 31, 1986, 61-19569; Jan. 31, 1986, 61-19570
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.15 4 Claims



1. A method of producing a carbon film on a substrate, comprising the steps of:

placing the substrate in a vacuum chamber having a graphite target electrode placed therein;

evacuating the vacuum chamber to a predetermined pressure;

introducing a gaseous mixture into the vacuum chamber to produce a gaseous atmosphere therein at a pressure ranging from 0.7 Pa to 665 Pa, the gaseous mixture including dibrorane gas mixed at a ratio ranging from 1 ppm to 20 ppm to hydrogen gas; and

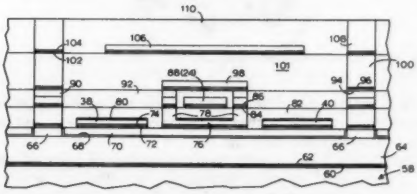
releasing atomic particles from the graphite target electrode through a reactive sputtering process performed in the gaseous atmosphere, thereby depositing a carbon film on the substrate.

5,073,242

METHOD OF MAKING INTEGRATED MAGNETIC READ/WRITE HEAD/FLEXURE/CONDUCTOR STRUCTURE

Harold J. Hamilton, Santa Clara, Calif., assignor to Censtor Corp., San Jose, Calif.

Division of Ser. No. 441,716, Nov. 27, 1989. This application Dec. 21, 1990, Ser. No. 632,958
Int. Cl.[5] G11B *5/127*
U.S. Cl. 204—192.22 21 Claims



1. A method of making an integrated, unitary read/write head/flexure/conductor structure for the reading and writing of information with respect to a relatively moving recording medium, said method comprising

forming in plural stages, and by a deposition process, an elongate dielectric flexure body, and

creating within such body, and also by a deposition process, in plural stages interspersed with the forming stages, magnetic read/write pole structure, and electrical coil and conductor means operatively associated with such pole structure.

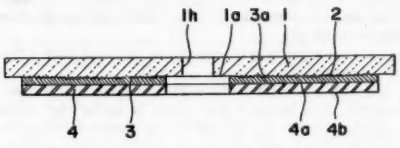
2. The method of claim 1, wherein such flexure body is formed of sputtered aluminum oxide.

5,073,243

METHOD FOR PRODUCING AN OPTICAL RECORDING MEDIUM

Akira Gotoh, Toride; Yukinobu Yamazaki, Ibaragi; Naoyuki Kikuchi, Toride; Shinkichi Horigome, Tachikawa; Motoyasu Terao, Tokyo; Horoyuki Suzuki, Ibaragi; Makoto Kitoh; Yuichi Kokaku, both of Yokohama, and Mitsuru Shimizu, Toride, all of Japan, assignors to Hitachi Maxwell, Ltd, Osaka and Hitachi, Ltd, Tokyo, both of, Japan

Division of Ser. No. 246,925, Sep. 19, 1988, Pat. No. 4,908,250, which is a continuation of Ser. No. 939,719, Dec. 9, 1986, abandoned. This application Dec. 29, 1989, Ser. No. 459,243
Claims priority, application Japan, Dec. 9, 1985, 60-275112; Feb. 19, 1986, 61-32977; Mar. 19, 1986, 61-59434; Mar. 19, 1986, 61-59437
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.26 15 Claims



1. A production method of an optical recording medium comprising:

providing a disc substrate having an uneven grooved pattern of prepits and pregrooves preformed or. one surface thereof at a predetermined vacuum condition in a chamber;

forming an under layer on said uneven surface pattern by sputtering a polymer material at said predetermined vacuum condition; and

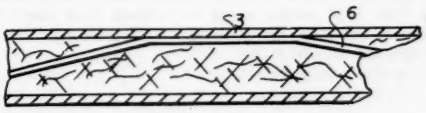
forming a recording layer of material on said under layer under a vacuum condition in said chamber continuously after the forming of said under layer wherein the polymer material has a first temperature at which said material can be melted, sublimated, or decomposed, a heat resistance superior to said disc substrate and a lower heat conductivity than said substrate, and the recording layer material has a second temperature at which said material can be melted, sublimated or decomposed, said first temperature being lower than said second temperature, whereby said under layer relaxes thermal shock transmitted from said recording layer to said disc substrate.

5,073,244

SELF-SUPPORTING RECEPTACLE, ESPECIALLY FOR USE AS AN ELECTROLYSIS CELL

Hans Körner, Wies, and Franz Wurm, Graz, both of Austria, assignors to Körner Chemieanlagenbau Gesellschaft m.b.H., Wies, Austria

Filed Mar. 5, 1990, Ser. No. 488,641
Claims priority, application Austria, Mar. 21, 1989, 661/89
Int. Cl.[5] C25B *9/00*; C25C *7/00*
U.S. Cl. 204—242 **10 Claims**



1. A self-supporting electrolytic cell comprising:

nested inner and outer shells each having a bottom wall and side walls and each made of a glass-fiber-reinforced synthetic resin;

means including spacers between the shells for holding same apart and defining a space therebetween; and

a plurality of horizontally extending and tensioned prestressing wires in the space being inward on the inner shell, the wires being arranged to apply an inwardly directed prestressing force on the inner wall that increases upward from the bottom walls.

5,073,245

SLOTTED CYLINDRICAL HOLLOW CATHODE/MAGNETRON SPUTTERING DEVICE

Virgle L. Hedgcoth, 1524 Hacienda Pl., Pomona, Calif. 91768

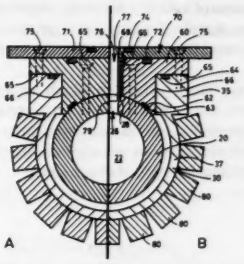
Filed Jul. 10, 1990, Ser. No. 550,719
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—298.21 **9 Claims**

1. A cathode target for use in sputtering a material, comprising:

a unitary hollow longitudinal member having a wall with an interior surface, at least the interior surface of the wall being comprised of the material to be sputtered;

magnetic means for providing magnetic flux lines within the interior and substantially parallel to the longitudinal axis of the hollow longitudinal member, said magnetic flux lines being substantially contiguous to all portions of the interior wall such that an electron plasma may be contained adjacent to substantially to all portions of the interior wall during the sputtering process; and

an aperture disposed in the wall of the hollow longitudinal member whereby some of the atoms sputtered from the interior surface of the hollow longitudinal member will travel through the aperture and other of the atoms sputtered from the interior surface of the hollow longitudinal



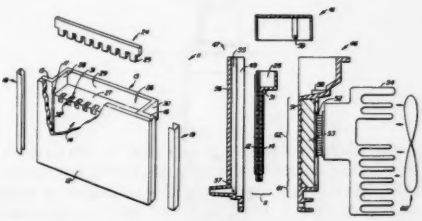
member will redeposit on the interior of the hollow longitudinal member.

5,073,246

SLAB ELECTROPHORESIS SYSTEM WITH IMPROVED SAMPLE WELLS AND COOLING MECHANISM

Daniel Y. Chu, Hercules, and John J. Barich, Martinez, both of Calif., assignors to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed May 16, 1990, Ser. No. 523,786
Int. Cl.[5] G01N *27/26*; B01D *57/02*
U.S. Cl. 204—299 R **19 Claims**



1. Apparatus for vertical slab gel electrophoresis, comprising:

a slab gel enclosure having opposing first and second flat walls defining a rectangular slab gel space in between which is open along one edge, said open edge defining the width of said rectangular slab gel space;

a buffer tank sized to contain said slab gel enclosure, said buffer tank including opposing third and fourth flat walls and a floor in between, said third flat wall at least coextensive with said rectangular slab gel space in width and height;

securing means for securing said slab gel enclosure inside said buffer tank with said first and third flat walls in contact and with a first gap between said open edge of said slab gel enclosure and said floor and a second gap between said second and fourth walls;

an electrode in said buffer tank positioned such that when said slab gel enclosure is so secured therein, said electrode is in said first gap; and

cooling means for drawing heat from said third flat wall.

14. Apparatus for casting and retaining a slab gel for use in electrophoresis, said apparatus comprising:

a first member comprised of a first flat plate of selected width and length;

a second member comprised of:

a second flat plate of length less than that of said first flat plate, one edge along the width of said second flat plate defined as an upper edge, and

a series of troughs extending to one side of said second flat plate at an obtuse angle with respect to said second flat

plate, said troughs intersecting said upper edge to define openings in said flat plate along said upper edge;

means for securing together said first and second members with a portion of said first flat plate extending beyond said upper edge, thereby defining a slab gel space between said first and second flat plates and adjacent to said upper edge; and

a comb-shaped insert with teeth which are equal in spacing and number, and at least equal in length and width, to said troughs, adapted to rest on said upper edge when said first and second members are so secured together, with said teeth extending into said slab gel space.

5,073,247

MEASURING SENSOR OF OXYGEN CONTENT OF HOT GAS WITH SPECIALLY SHAPED PROTECTIVE TUBE

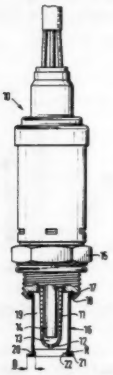
Helmut Weyl, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 7, 1991, Ser. No. 651,767

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1990, 4009890

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—428 **12 Claims**



1. A measuring sensor for determining the oxygen content of gases which is capable of use with hot gases, having a tubular metal casing which in its interior holds and at least partly surrounds tightly a longitudinal section of a sensor element, or a carrier therefor, or both a sensor element and a carrier therefor, said sensor element and said carrier therefor consisting essentially of ceramic material, said sensor element or said carrier therefor or both said sensor element and said carrier protruding out of the interior of said metal casing in a direction towards a flow of a gas to be measured, an, in the region of said protrusion, being surrounded in spaced relation by a protective tube which at its end section father from said gas flow is connected by a considerably tight connection to said metal casing and at its end nearer said gas flow extends beyond said sensor element or said carrier thereof or both said sensor element and said carrier, is open and is so disposed that gas of said gas flow must be deflected about 90° in direction out of said gas flow in order to reach said sensor element, characterized in that

said protective tube (**10**,10′) has no lateral openings and is formed with at least one coaxially running external groove (**20**, 20′, 20″) bulging into the interior of the protective tube, one said groove being located directly at said open end of said protective tube and terminating the open end of said tube as an outward flange of said protective tube.

5,073,248

ASPHALTENE DISPERSANTS - INHIBITORS

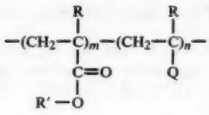
William K. Stephenson, Sugarland, and Morris Kaplan, Houston, both of Tex., assignors to Nalco Chemical Company, Naperville, Ill.

Division of Ser. No. 433,885, Nov. 8, 1989, Pat. No. 5,021,498. This application Feb. 14, 1991, Ser. No. 655,478

Int. Cl.[5] C08L *33/06*

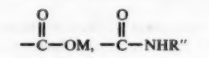
U.S. Cl. 208—22 **8 Claims**

1. A method of dispersing asphalt/asphaltenes in petroleum, crude oil, or any hydrocarbon fraction thereof which comprises adding an effective dispersing amount of an asphalt/asphaltene dispersant to said petroleum, crude oil, or fraction thereof, said dispersant comprising an admixture of polymer A and polymer B ranging from 90 to 10 weight percent polymer A and from 10 to 90 weight percent polymer B, wherein polymer A is an alkyl substituted phenol-formaldehyde liquid resin having a weight average molecular weight ranging from about 1,000 to about 20,000 and an alkyl substituent containing from 4 to 24 carbon atoms, which alkyl substituent may be a linear or branched alkyl group; and polymer B is a hydrophilic/lipophilic vinylic polymer having a structure essentially described as:

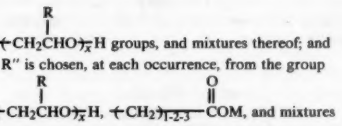


wherein R is chosen at each occurrence, from hydrogen and methyl groups and R′ is a hydrocarbonaceous group containing from 4–24 carbon atoms and chosen from linear or branched alkyl groups, aromatic, cyclic, alkaryl, aralkyl groups, and mixtures thereof; and

Q is chosen from the groups,



and mixtures thereof; and M is chosen, at each occurrence, from the group hydrogen, alkali metal cations, alkaline earth metal cations, ammonium ions, protonated amines, quaternary amines, hydroxyethyl, hydroxypropyl and



thereof; and

m and n are both integers of sufficient number to achieve a weight average molecular weight ranging from about 5,000–250,000 and being of such a ratio as to describe the presence of from 90 to 10 weight percent of the lipophilic monomer, m, and from 10 to 90 weight percent of the hydrophilic monomer, n, and

wherein x ranges from 1 to 20.

5,073,249

HEAVY OIL CATALYTIC CRACKING PROCESS AND APPARATUS

Hartley Owen, Belle Mead, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Nov. 21, 1989, Ser. No. 439,753

Int. Cl.[5] C10G *9/16*

U.S. Cl. 208—48 Q **11 Claims**

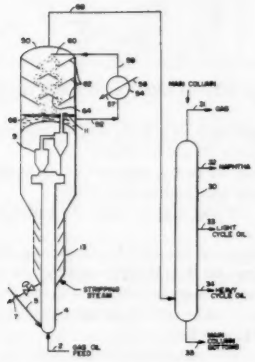
1. A fluidized catalytic cracking process for catalytic crack-

ing of a feed comprising hydrocarbons having a boiling point above about 750 F comprising:

a. catalytically cracking said feed in a catalytic cracking zone riser reactor having a height in excess of 30 meters at catalytic cracking conditions by contacting said feed with a source of hot regenerated cracking catalyst to produce a riser effluent mixture having an effluent temperature above 1000 F and comprising cracked products and spent cracking catalyst containing coke and strippable hydrocarbons;

b. separating within a vessel said cracking zone effluent mixture into a cracked product vapor phase including hydrocarbons having a boiling point above about 750 F and having a temperature above 1000 F and a spent catalyst rich phase;

c. stripping and regenerating said spent catalyst to produce regenerated catalyst which is recycled to crack heavy feed;



d. removing said cracked product vapor from said vessel via a vapor line connective with a quench zone;

e. quenching the hot cracked vapor product with a quench liquid in said quench zone to reduce the temperature of the cracked product vapor below 750 F and condense a majority of the cracked product hydrocarbons boiling above about 750 F to produce a quench zone heavy liquid stream comprising condensed catalytically cracked hydrocarbons having a boiling point above about 750 F and produce a separate quenched vapor product stream; and charging, via a vapor transfer line connective with a product fractionator, a quenched vapor stream consisting essentially of vapor and from which at least a majority of the cracked product hydrocarbons having a boiling point above about 750 F have been removed; and

f. fractionating the quenched vapor product to recover catalytically cracked products.

5,073,250

STAGED CATALYST REFORMING TO PRODUCE OPTIMUM OCTANE BARREL PER CALENDAR DAY REFORMATE PRODUCTION

Jules M. Kline, San Anselmo; Stephen J. Miller, San Francisco, and Bernard F. Mulaskey, Fairfax, all of Calif., assignors to Chevron Research & Technology Company, San Francisco, Calif.

Filed Mar. 2, 1990, Ser. No. 488,333
Int. Cl.[5] C10G *35/06*
U.S. Cl. 208—65 **14 Claims**

1. A process for catalytically reforming feed hydrocarbons to produce a product reformate, in a multistage reforming operation, comprising:

contacting the feed in a penultimate reforming stage under catalytic reforming conditions including a reforming pressure in a range from about 30 psig to about 350 psig with a first catalyst comprising a Group VIII metal dispersed on an inorganic oxide support; and

contacting the effluent from said penultimate reforming stage in a final reforming stage under catalytic reforming conditions and at substantially the same pressure as is maintained in said penultimate reforming stage with a second catalyst comprising a noble metal dispersed on inorganic oxide support; and

wherein said reforming pressure in said penultimate and final stages is selected to provide optimal OB/CD production of product reformate from said final reforming stage, wherein OB/CD is defined by the equation:

$$OB/CD = IB \times \frac{LV\ \%\ \text{yield}}{100} \times \frac{RL}{(RL + RgT)} \times (FRON - PRON)$$

where

IB=barrels of input naphtha to the reforming operation per operating day,

LV %=liquid volume percent yield of C_{5+} for the reforming operation,

RL=the length of time between regenerations (or replacements),

RgT=time needed to regenerate (or replace) both catalysts,

FRON=the RON of the final stage C_{5+} reformate, and

PRON=the refinery pool RON.

5,073,251

METHOD OF AN APPARATUS FOR RECOVERING OIL FROM SOLID HYDROCARBONACEOUS MATERIAL

Ludlow S. Daniels, 12 Ricardo La., Mill Valley, Calif. 94941

Continuation of Ser. No. 307,193, Feb. 3, 1989, abandoned, which is a continuation of Ser. No. 183,261, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 543,260, Oct. 19, 1983, abandoned. This application Nov. 13, 1989, Ser. No. 436,934

Claims priority, application Australia, Oct. 19, 1982, PF6415; Oct. 19, 1982, PF6416; Oct. 19, 1982, PF6417
Int. Cl.[5] C10G *1/00*
U.S. Cl. 208—407 **8 Claims**

1. A method of recovering oil from solid hydrocarbonaceous material which comprises the steps of:

contacting fresh feed hydrocarbonaceous material particles with heat transfer particles in a dense phase fluidized bed, the fluidization of said dense phase fluidized bed being established during an initial start-up period by injecting a fluidizing medium into a dense phase bed of particles, and following said initial start-up period the fluidizing medium for the bed being retained within the bed and being generated at least primarily by fluid released by conversion of kerogen in the feed material and without there being a need to inject a fluidizing medium into the bed from an external source,

withdrawing from the bed oil vapour which is produced as a result of heat exchange between the heat transfer particles and the feed particles,

progressively withdrawing the heat transfer particles and spent feed material particles from the fluidized bed,

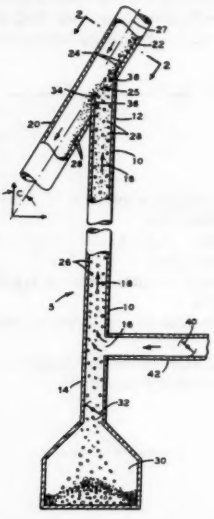
heating the heat transfer particles in a heating region external of the fluidized bed, and

recirculating the heated particles through the fluidized bed with fresh feed material particles.

5,073,252
PNEUMATIC SIZE SEPARATOR FOR NICKLE-CONTAINING PARTICLES

Gary F. Ouig, Lively, Canada, assignor to INCO Limited, Toronto, Canada

Filed May 21, 1990, Ser. No. 526,177
Claims priority, application Canada, May 23, 1989, 600360
Int. Cl.[5] B07B 4/00
U.S. Cl. 209—139.1 11 Claims



1. A device for separating nickel-containing particles by size comprising:

a substantially vertical cylindrical pipe having an open upper end, a closed lower end and an inner diameter,

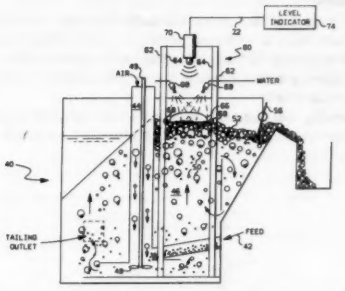
a gas supply inlet located between the open upper end and the closed lower end for supplying a near straight line unobstructed upward flow of gas through the vertical pipe from the gas supply inlet to the open upper end of the vertical pipe at a relatively constant rate, the gas supply inlet being a distance of at least 9 times the inner diameter of the vertical pipe from the open upper end of the vertical pipe for reducing turbulence and

a downwardly sloped cylindrical pipe having a circular transverse cross section for supplying mixed size particles to the vertical pipe, the downwardly sloped pipe having a lower side connected to the open upper end of the vertical pipe to form an opening in the lower side of the downwardly sloped pipe, the opening having an upstream edge and a downstream edge, the downwardly sloped conduit being substantially linear between a location above the opening and a location below the opening and the circular transverse cross section of the downwardly sloped pipe being substantially uniform between the location above the opening and the location below the opening, and the upper surface of said downwardly sloped conduit opposite the vertical conduit being closed the downwardly sloped pipe having a particle dam extending partially into the downwardly sloped pipe from the downstream edge of the opening for allowing coarser particles to fall, against the upward flow of gas, down the vertical pipe to the closed end for collection and for lifting finer particles over the particle dam with the upward flow of gas for further transporting of the finer particles down the downwardly sloped pipe.

5,073,253
FROTH LEVEL MEASUREMENT

Marshall D. Bishop; Lowell A. Gray, both of Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 11, 1990, Ser. No. 551,595
Int. Cl.[5] B03D 1/14; G01F 23/30
U.S. Cl. 209—164 15 Claims



1. A wire guided float level measurement apparatus comprising:

a float, supportable on a froth, and having a suitable surface for reflecting ultrasonic pulses;

a guide wire, vertically disposed in an upright frame, for positioning said float on said froth;

means for washing mineral from the upper surface of said float;

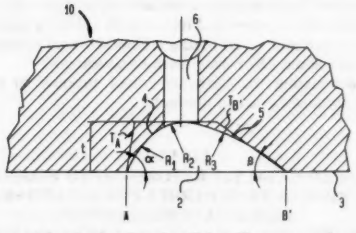
an ultrasonic level detector for measuring the level of said float when said float is supported by said froth; and

means for supporting said ultrasonic detector directly above said float so as to aim ultrasonic pulses generated in said detector at said float.

5,073,254
CYLINDRICAL SCREENING BASKET

Kurt Beisenherz, Regensburg, and Waldemar R. Knodel, Pentling, both of Fed. Rep. of Germany, assignors to Heinrich Fiedler GmbH & Co. KG, Regensburg, Fed. Rep. of Germany

Filed Aug. 14, 1990, Ser. No. 566,979
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1989, 3927202
Int. Cl.[5] B07C 1/20; B01D 39/10
U.S. Cl. 209—273 23 Claims



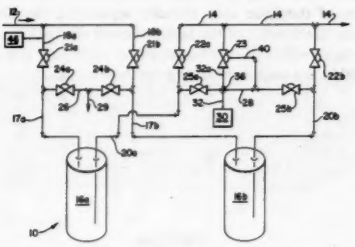
1. A screening basket for classifying fiber suspensions; comprising a wall which has an inner wall surface facing the fiber suspension and includes screen openings leading into grooves provided at said inner wall surface, said grooves extending essentially transversely to the flow direction of the fiber suspension and being arched to define a downstream flank and an upstream flank, with said downstream flank having a sharper curvature than said upstream flank, said downstream flank and said upstream flank extending relative to said inner wall surface at an angle of less than 90° and defining with said inner wall surface a juncture edge of rounded configuration.

5,073,255

WATER TREATMENT APPARATUS

Danilo Chili, Bologna, Italy; Ramon Bragos, Barcelona, Spain; William W. Norton, Lincolnshire, and Stanley F. Rak, Mundelein, both of Ill., assignors to Culligan International Company, Northbrook, Ill.

Filed Oct. 5, 1989, Ser. No. 417,580
Int. Cl.[5] C02F *1/42*
U.S. Cl. 210—96.1 24 Claims



1. In water treatment apparatus having a raw water inlet and a treated water outlet, and having at least a first and a second water treatment tank plus conduit means for passing water from said inlet to said outlet through said first and second tanks in parallel flow relation, the improvement comprising, in combination:

means for automatically regenerating said tanks when said tanks are in at least partially exhausted condition; first valve means for flow control and for operatively connecting said automatic regenerating means with said tanks and means for controlling said first valve means to automatically cause alternating, intermittent connection between said tanks and said regenerating means in response to predetermined criteria while the tank connected to the regenerating means is connected to prevent flow from said tank through said outlet, and while the tank not connected to said regenerating means is connected to provide flow through said outlet, drain line means communicating with each tank, and second valve means controlling each drain line means to open said drain line means to receive spent regenerating solution from the tank undergoing regeneration and to automatically close off said drain line means from the tank not connected to said regenerating means, whereby continuous water treatment normally in parallel flow, with alternating, intermittent regeneration of said tanks, may be provided.

5,073,256

EQUIPMENT FOR BIOLOGICAL WATER TREATMENT, IN PARTICULAR FOR DENITRIFICATION OF RAW WATER TO PRODUCE POTABLE WATER

Rolf Sieksmeyer, and Jürgen Wittek, both of Nordenham, Fed. Rep. of Germany, assignors to Norddeutsche Seekabelwerke AG, Nordenham, Germany

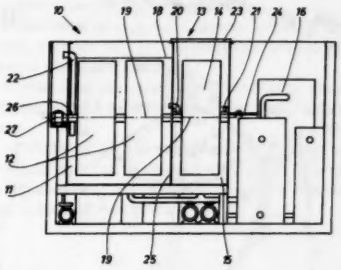
Division of Ser. No. 121,835, Nov. 17, 1987, Pat. No. 4,935,130, which is a continuation of Ser. No. 800,939, Nov. 22, 1985, abandoned. This application Dec. 14, 1989, Ser. No. 450,892
Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442510; Dec. 22, 1984, 3447177
Int. Cl.[5] C02F *3/30*
U.S. Cl. 210—151 5 Claims

1. Equipment for biological denitrification of potable water, comprising:

inlet means (22) for receiving nitrate-containing potable water including reducing agents;

an anoxic biological stage (10) comprising: an open first vessel (11), coupled to said inlet means (22), for receiving the water; and a first drum reactor (12) which is completely submerged in the water in said open vessel (11) and which is fixed to a rotatable drive shaft (26) extending horizontally along a longitudinal axis (19) through the centre of rotation of said drum reactor;

an aerobic biological stage (13) for aerating the water and comprising: an open second vessel (15); a second drum reactor (14) which is only partially submerged and which is also fixed to said drive shaft (26); and discharge pipe



means (24) for discharging water from said second open vessel (15);

a common central partition (25) separating said open vessels; and

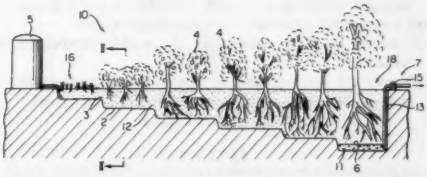
connecting line means (20) connecting said open vessels in series for feeding the water from the first open vessel to said second open vessel.

5,073,257

APPARATUS FOR TREATING WATER

Teruo Higa, Ginowan, Japan, assignor to AKWN Xo., Ltd. and Ryoko Co., Ltd.

Continuation of Ser. No. 268,601, Nov. 7, 1988, abandoned, which is a division of Ser. No. 62,351, Jun. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 863,575, May 15, 1986, abandoned. This application Nov. 23, 1990, Ser. No. 618,002
Claims priority, application Japan, Sep. 12, 1985, 60-202281
Int. Cl.[5] C02F *3/32*
U.S. Cl. 210—170 10 Claims



6. Apparatus for treating contaminated water, comprising:

a treatment zone having water-impermeable side and bottom walls, said treatment zone being located beneath the surface of the earth, said bottom walls descending downwardly in a series of steps, form an input end having an input means to an output end having an output means, the top surface of each of said steps being substantially horizontal, said treatment zone containing only soil or other constituents naturally occurring in said zone or artificially added thereto and having plants growing therein which vary from shallowrooted plants positioned near the input end to deep-rooted plants positioned near the output end; whereby the contaminated water may be applied to said soil at said input end through input means so as to allow the water to flow through said soil from said input end to said output end solely by force of gravity and treated water may be collected through output means at the bottom portion of said output end.

5,073,258

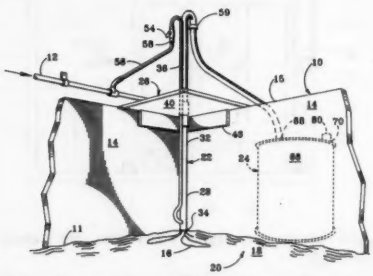
APPARATUS FOR REMOVING CONTAMINANTS FROM A LIQUID RESERVOIR

George E. Boullain, II, P.O. Box 582, Ontario, Calif. 91762, and Edward C. Allen, 23993 Eucalyptus Ave., No. 44, Moreno Valley, Calif. 92388

Filed Apr. 25, 1990, Ser. No. 514,111

Int. Cl.[5] B08B *9/08*

U.S. Cl. 210—172 **23 Claims**



1. A pneumatic skimming apparatus for removing contaminants from a liquid reservoir, comprising:

(a) a tubular wand member having an end inlet;

(b) means for supporting the wand member relative to the reservoir with the inlet of the wand member extending downwardly into the reservoir, the means for supporting the wand member comprising:

(i) a base;

(ii) mount means for mounting the base in fixed relation to the reservoir, the mount means comprising a horizontally disposed plate surface of the base for resting on an upper extremity of the reservoir and a locating member fixably connected to the base and extending downwardly from the plate surface for engaging a side wall of the reservoir; and

(iii) locating means on the base for fixably locating the wand member;

(c) a nozzle mounted within the wand member proximate the inlet thereof, the nozzle being oriented within the wand member in a direction away from the inlet;

(d) means for connecting the nozzle to a source of pressurized gas whereby a vacuum is produced at the inlet;

(e) a vessel for receiving the contaminants; and

(f) means for fluid connecting the wand member to the vessel,

whereby the contaminants are drawn from the reservoir and transported from the wand member into the vessel.

5,073,259

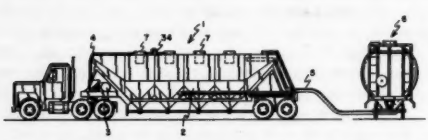
MANHOLE MOUNTED FILTERING SYSTEM FOR SELF-LOADING SEMI-TRAILER

Keith F. Solimar, New Brighton, Minn., assignor to Solimar Yachts, Fridley, Minn.

Continuation of Ser. No. 378,021, Jul. 11, 1989, abandoned. This application Oct. 1, 1990, Ser. No. 593,315

Int. Cl.[5] B01D *25/50*

U.S. Cl. 210—232 **9 Claims**



3. An apparatus for evacuating the interior of a tank during a procedure of pneumatically loading particulate material into the tank, comprising:

a vacuum pump;

means for connecting the vacuum pump to the interior of the tank such that the pump withdraws air from a first tank via a stream of fluid;

at least one filter unit located within the fluid stream between the tank and the vacuum pump for removing particulate matter from the fluid stream and returning it to the tank, the filter unit being physically located within the tank; and

further comprising a canister that surrounds sides and bottom of the filter unit, thereby separating the filter unit from the interior of the tank; wherein the tank has a manhole therein and the canister and filter unit are located within the periphery of the manhole.

5,073,260

SWITCHOVER DEVICE

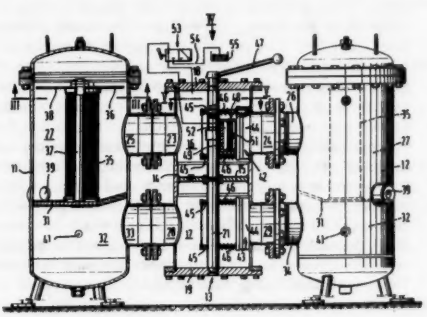
Werner Wilkendorf, Ottweiler, Fed. Rep. of Germany, assignor to HYDAC Filtertechnik GmbH, Sulzbach/Saar, Fed. Rep. of Germany

Filed Apr. 11, 1990, Ser. No. 507,495

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1989, 8907211[U]

Int. Cl.[5] B01D *35/12*

U.S. Cl. 210—238 **19 Claims**



1. A switchover device for controlling flow of a liquid, comprising:

a housing with a wall surrounding an interior space of said housing by an interior surface;

a housing with a wall surrounding an interior space of said housing by an interior surface;

at least one inlet opening and at least two outlet openings in said wall for liquid flow, each of said outlet openings being surrounded by a rim facing said interior space;

a closure means with a closure surface facing said interior surface of said wall and surrounded by a rim for closely and selectively contacting said rim of each of said outlet openings, said closure means being movable from a first closing position at one of said outlet openings to a second closing position at the other of said outlet openings;

pressing means for producing a force pressing said rim of said closure means into close contact with said rims of said outlet openings when said closure means is in said closing positions covering said outlet openings;

releasing means for releasing said closure means from said close contact; and

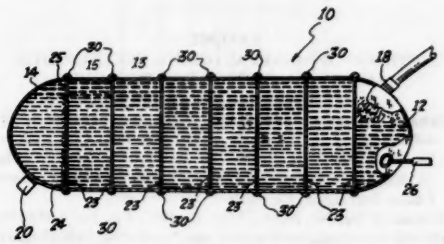
operating means for moving said closure means from one of the closing positions to the other of said closing positions.

5,073,261

METHOD AND APPARATUS FOR SEPARATING OIL FROM WATER AND STORING THE OIL

Trond Conradi, 108 Little John Rd., Williamsburg, Va. 23185, and Hugh Williams, 400 E. Randolph Dr., Apt. #3024, Chicago, Ill. 60601

Filed Aug. 17, 1990, Ser. No. 568,993
Int. Cl.[5] C02F 1/40; E02B 15/04
U.S. Cl. 210—242.1 16 Claims



1. A collapsible container for separating oil and water and containing and transporting the separated oil comprising:

a flexible water impervious container having at least three chambers capable of holding oil and water, said chambers attached to

each other serially along a linear axis so that each of said chambers has at most two neighboring chambers, one of said chambers located at one end of said container being an inlet chamber, one of said chambers located at the opposite end of said device from said inlet chamber being an outlet chamber, and said chambers located between said inlet and said outlet chambers being intermediate chambers;

at least one lower opening baffle, said lower opening baffle being substantially vertically disposed within said container, each of said lower opening baffles having an aperture at the lowermost part of said lower opening baffle through which liquids may flow, a first lower opening baffle connecting said inlet chamber to one of said intermediate chambers, and additional lower opening baffle connecting each of said intermediate chambers to another one of said intermediate chambers if a plurality of intermediate chambers are provided;

an upper opening baffle, said upper opening baffle being substantially vertically disposed within said container, said upper opening baffle having an aperture at the uppermost part of said upper opening baffle through which liquids may flow, said upper opening baffle connecting said outlet chamber to one of said intermediate chambers;

means through said container for allowing an oil and water mixture to enter said inlet chamber; and

means through said container for allowing material within said outlet chamber to exit said outlet chamber.

5,073,262

MULTI-PURPOSE ROTATING MEMBRANE FILTER

Walter F. Ahlberg, 7512 Burgoyne, #312, Houston, Tex. 77063, and Joseph F. Long, 1335 Lost Creek Blvd., Austin, Tex. 78746

Continuation-in-part of Ser. No. 338,098, Apr. 14, 1989, Pat. No. 4,925,557. This application Feb. 14, 1990, Ser. No. 480,680
Int. Cl.[5] B01D 61/18
U.S. Cl. 210—321.68 6 Claims

1. A Multi-Purpose Rotating Membrane Filter Unit comprising:

a) a rigidly mounted cylindrical body;

b) a rotatable hollow shaft means in said rigidly mounted cylindrical body;

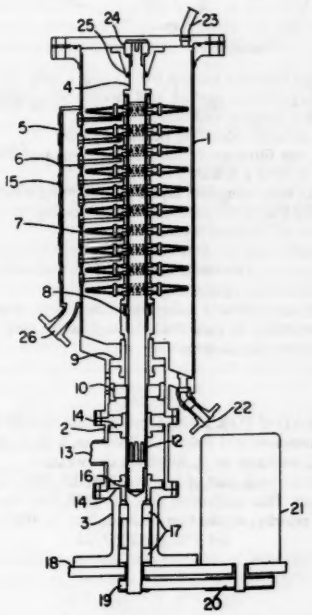
c) a plurality of controlled pore size membrane-covered hollow disc means mounted on said rotatable hollow shaft means with openings in said rotatable hollow shaft means communicating with an interior of said controlled pore size membrane-covered hollow disc means; said disc means comprising:

1) two doughnut shaped flat perforated metal plates with each of said perforated metal plates welded to a doughnut shaped hub on an interior periphery and welded together at an outer periphery to form an open interior double truncated cone shaped disc;

2) a minimum of one metal screen covering fastened to each exterior side of said doughnut shaped perforated metal plates and said hub;

3) a controlled pore size plastic membrane covering adhering to each exterior side of said metal screen covering;

4) a minimum of one metal pipe extending vertically through said hub to allow upward liquid flow and openings in said hub to communicate with an interior of said rotatable hollow shaft;



d) a first draw-off means in said rigidly mounted cylindrical body whereby material may be continuously removed from the upper part of said rigidly mounted cylindrical body;

e) a second draw-off means in said rigidly mounted cylindrical body whereby material may be removed from a lower part of said rigidly mounted cylindrical body;

f) a third draw-off means in said rigidly mounted cylindrical body whereby filtrate may be continuously removed from the interior of said rotatable hollow shaft means;

g) a back pulse pump means connected with said third draw-off means where in said filtrate may be periodically pressured to backflow through said controlled pore size membrane-covered hollow disc means,

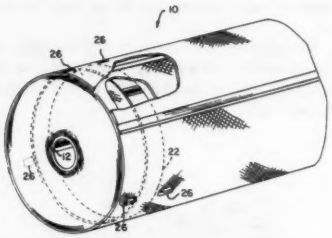
h) a feed manifold means mounted on said rigidly mounted cylindrical body with exit openings from said feed manifold means providing an inlet feed between each pair of said plurality of controlled pore size membrane-covered hollow disc means.

5,073,263

METHOD AND ARTICLE FOR RESTRAINING EXTRUSION OF FEED SPACERS AND CIRCUMFERENTIAL EXPANSION IN SPIRAL FILTRATION MODULES

Carlos A. Fagundes, 52 Hanks St., Lowell, Mass. 01852; Thomas C. McDermott, Jr., 19 Beliveau Dr., Lynn, Mass. 01904, and David M. Colby, 40A Circuit Rd., Medford, Mass. 02155

Filed Sep. 21, 1990, Ser. No. 586,578
Int. Cl.[5] B01D *61/08*
U.S. Cl. 210—321.83 **11 Claims**



1. A spiral filtration module for filtering a fluid into a filtrate portion and permeate portion, said module being adapted to be received in a housing and comprising:

a longitudinally extending permeate tube;

at least one filtration membrane leaf wrapped around said tube to form a plurality of layers;

means for separating said layers to accommodate the flow of said fluid between same and for presenting an outerwrap around said wound layers;

band means extending around said outerwrap and in tight engagement with the latter to hold said wound layers and the outerwrap against expansion; and

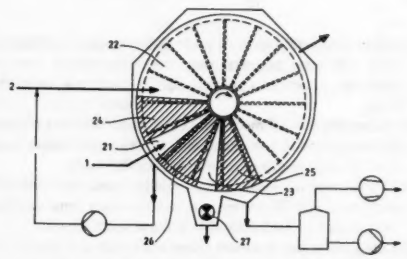
spacer means and said outerwrap means both characterized by the ability to pass fluid through when said module is placed in said housing;

5,073,264

APPARATUS FOR TREATING FIBER SUSPENSION

Pasi H. Immonen, and Raimo O. Kohonen, both of Savonlinna, Finland, assignors to A. Ahlstrom Corporation

Continuation-in-part of Ser. No. 265,580, Nov. 1, 1988, abandoned. This application Jun. 26, 1990, Ser. No. 544,032
Claims priority, application Finland, Nov. 5, 1987, 874887
Int. Cl.[5] B01D *33/23*
U.S. Cl. 210—404 **8 Claims**



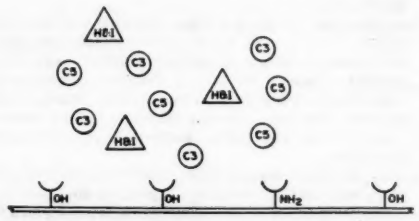
1. An apparatus for treating pulp, the apparatus comprising a pressure-proof outer casing for containing a suspension to be treated; a shaft having an axis arranged rotatably in the outer casing; and a plurality of discs attached substantially radially to said shaft within said casing; each of said discs being formed by a plurality of sectors, each sector having two opposite, axially spaced filter surfaces extending substantially perpendicularly to said shaft for allowing liquid from said suspension to be drained therethrough, said filter surfaces defining a liquid compartment therebetween for said liquid, said opposite filter surfaces of the sectors of said disc each forming an essentially annular filter surface on opposite sides of each disc; said liquid compartment being in communication with a liquid discharge means; the apparatus further comprising members for dividing said annular filter surfaces into at least two portions, said members being stationary relative to the casing, said members being provided for separating different treatment stages of fiber suspension from one another.

5,073,265

METHODS OF MANUFACTURING NUCLEOPHILIC MATERIAL MODIFIED FOR IMPROVED BIOCOMPATIBILITY

Richard J. Johnson, 192 Knightsbridge Dr., Mundelein, Ill. 60060; Dennis E. Chenoweth, 21910 Pine Lake Cir., Kildeer, Ill. 60047; Daniel R. Boggs, 308 Amherst Ct., Vernon Hills, Ill. 60061, and Michael J. Lysaght, 25400 Barsumian, Tower Lakes, Barrington, Ill. 60010

Division of Ser. No. 24,652, Mar. 11, 1987, Pat. No. 4,882,106, which is a continuation-in-part of Ser. No. 20,794, Feb. 27, 1987, abandoned. This application May 4, 1989, Ser. No. 347,845
Int. Cl.[5] B01D *69/08*
U.S. Cl. 210—500.23 **8 Claims**



1. A method of treating a material having at least one nucleophilic group to prevent complement activation and bind beta-2-microglobulin when said material is in contact with a biological solution, said method comprising the steps of

exposing the material to a fluid including a constituent containing 2 to 4 carbon atoms and an activated carbonyl group to substitute said material with said carbonyl group to a degree of substitution between 0.001 and 0.018.

5,073,266

APPARATUS FOR SEPARATING COMMINGLING HEAVIER AND LIGHTER IMMISCIBLE

Will D. Ball, IV, Tulsa, Okla., assignor to Natco, Tulsa, Okla.

Filed Oct. 30, 1990, Ser. No. 605,644
Int. Cl.[5] C02F *1/40*
U.S. Cl. 210—519 **6 Claims**

1. Apparatus for separating commingled heavier and lighter immiscible fluids and solids comprising:

an upright vessel having an outer at least substantially vertical sidewall;

centrally within said vessel, means of directing commingled liquid flow vertically upwardly within said vessel;

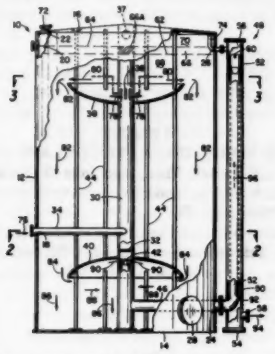
means of establishing a heavier and lighter liquid/liquid interface within the upper portion of said vessel;

means of diverting said vertical upward flow to radial, horizontal outward flow in the direction toward said sidewall within the upper portion of said vessel and in close proximity and below said liquid/liquid interface;

means of directing fluid flow from the horizontal to vertically downward flow in flow paths adjacent said sidewall;

means of directing said vertical downward fluid flow to radial, horizontally inward flow in the lower portion of said vessel and into a centrally positioned fluid outlet wherein the heavier fluid component is withdrawn com-

prising a generally horizontal extending spreader baffle above said centrally positioned fluid outlet; and



means of withdrawing lighter liquid from above said liquid/-liquid interface.

5,073,267

PROCESS FOR THE EXTRACTION OF VOLATILE COMPOUNDS WITH SUPERCRITICAL CARBON DIOXIDE, AND COMPOUNDS OBTAINED

Jacques Adda, Versailles, and Jean-Luc Lorne, Clichy, both of France, assignors to Institut National de la Recherche Agronomique, Paris, France

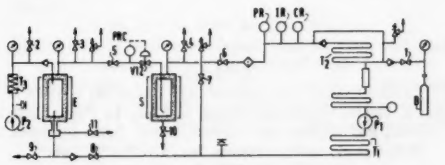
PCT No. PCT/FR89/00158, § 371 Date Jan. 12, 1990, § 102(e) Date Jan. 12, 1990, PCT Pub. No. WO89/09639, PCT Pub. Date Oct. 19, 1989

PCT Filed Apr. 6, 1989, Ser. No. 458,736

Claims priority, application France, Apr. 11, 1988, 88 04765

Int. Cl.[5] B01D *11/00*

U.S. Cl. 210—634 **14 Claims**



1. Process for the extraction of volatile compounds from a starting material with supercritical carbon dioxide, according to which a percolation of supercritical gas through the said starting material is conducted, the carbon dioxide loading with extractable compounds, then, when the percolation pressure reaches a predetermined value, the percolation medium is let down, feeding the latter into a separation zone in which the volatile compounds are trapped in the solid carbon dioxide formed, the volatile compounds being recovered in aqueous solution after sublimation of CO_2, characterized in that the extraction is conducted, in the separation zone, in the presence of an amount of trapping medium which is sufficient to retain the said volatile compounds.

5,073,268

PROCESS AND SYSTEM FOR PURIFYING PURE WATER OR ULTRAPURE WATER

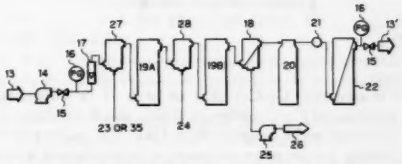
Takayuki Saito; Ken Nakajima; Yoki Iwase, all of Kanagawa; Yukio Ikeda, Tokyo, and Hiroyuki Shima, Kanagawa, all of Japan, assignors to Ebara Corporation, Tokyo and Ebara Research Co., Ltd., Fujisawa, both of, Japan

Filed Dec. 11, 1990, Ser. No. 625,427

Claims priority, application Japan, Dec. 19, 1989, 1-327135

Int. Cl.[5] B01D *15/04*

U.S. Cl. 210—638 **3 Claims**



1. A process for purifying pure water or ultrapure water by treating pure water or ultrapure water to produce ultrapure water of high purity, which process comprises the steps of:

(a) dissolving an oxidizing agent comprising one of ozone or hydrogen peroxide in pure water or ultrapure water and irradiating the resulting water with ultraviolet rays, whereby a total organic carbon component is decomposed and simultaneously the pure water or ultrapure water is sterilized;

(b) dissolving hydrogen gas in the treated water obtained in step (a) and irradiating the resulting water with ultraviolet rays, whereby dissolved oxygen contained in the water to be treated and dissolved oxygen derived from the addition of the oxidizing agent are decomposed into H_2O and simultaneously sterilization is effected;

(c) passing treated water obtained in step (b) over one side of a gas permeable membrane while keeping the other side of the membrane in a vacuum, to effect membrane degassing for said water, whereby remaining H_2 gas is removed;

(d) passing treated water obtained in step (c), through an ion exchange resin layer which is a mixture of a H^+ strongly acidic cation exchange resin and a OH^- strongly basic anion exchange resin, whereby ions and silica are removed; and

(e) subjecting treated water obtained in step (d), to ultrafiltration, whereby fine particles are removed.

5,073,269

PREPARATION OF WATER-SOLUBLE COPOLYMERS OF MALEIC ACID AND USE THEREOF AS WATER TREATMENT AGENTS

Walter Denzinger, Speyer; Heinrich Hartmann, Limburgerhof; Ulrich Goeckel, Boehl-Iggelheim; Felix Richter, Bruehl; Hans-Juergen Raubenheimer, Ketsch, and Ekhard Winkler, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Corporation, Parsippany, N.J.

Continuation of Ser. No. 140,983, Jan. 5, 1988, abandoned. This application May 25, 1990, Ser. No. 529,772

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1987, 3700535

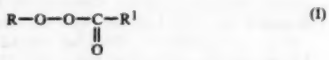
Int. Cl.[5] C02F *1/00*; C08F *4/28*

U.S. Cl. 210—698 **4 Claims**

1. A process for preventing the deposition of hardness formers in water-conducting systems, comprising:

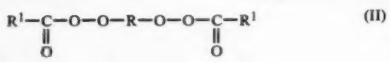
adding to said water-conducting system a deposition preventing copolymer in an amount effective to prevent deposition of hardness formers, said deposition preventing polymer prepared by the process of copolymerizing (a) from 99 to 80% by weight of maleic anhydride and (b) from 1 to 20% by weight of a monoethylenically unsaturated monomer copolymerizable therewith, the percentages (a) and (b) always adding up to 100, at from 60° to

200° C. in an aromatic hydrocarbon in the presence of from 1 to 20% by weight, based on the monomers (a) and (b), of a peroxyester polymerization initiator selected from the group consisting of the following formulae



(I)

and



(II)

wherein

R^1 is saturated C_1–C_{17}-alkyl or aryl, H or ethylenically unsaturated C_2–C_{17}-alkenyl, which may be substituted by carboxyl, and R in the formula I is a C_3–C_{22}-alkyl or alkyl having one or more aromatic substituents and mixtures thereof so that the conversion of maleic anhydride is above 99%, so that copolymers of maleic anhydride are obtained containing less than 1% by weight of unpolymerized maleic anhydride and hydrolyzing the anhydride groups in the copolymer.

5,073,270

USE OF REDUCING AGENTS TO CONTROL SCALE DEPOSITION FROM HIGH TEMPERATURE BRINE

Darrell L. Gallup, Chino Hills, and John W. Jost, Santa Ana, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 919,232, Oct. 15, 1986, Pat. No. 4,830,766, which is a continuation-in-part of Ser. No. 590,016, Mar. 15, 1984, abandoned. This application Mar. 13, 1989, Ser. No. 322,681

Int. Cl.[5] C02F *5/08*

U.S. Cl. 210—698 **81 Claims**

1. A method for treating a geothermal fluid having a pH of 7 or below containing a dissolved trivalent transition-metal cation and a dissolved siliceous material which tend to interact to form insoluble trivalent silicates, said method comprising adding to said fluid a brine-soluble reducing agent comprising a sulfur-containing agent having a reduction potential capable of reducing said trivalent cation to a divalent cation.

5,073,271

UTILIZATION OF SOOT FROM SYNTHESIS GAS PRODUCTION IN SEWAGE TREATMENT

Bruno Sander, Ludwigshafen; Siegfried Marquardt, Bobenheim-Roxheim; Uwe Kempe, Dannstadt-Schauernheim; Wolfgang Vodrazka, Freinsheim, and Gero Lueth, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 30, 1991, Ser. No. 648,534

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1990, 4003242

Int. Cl.[5] C02F *11/10*

U.S. Cl. 210—710 **1 Claim**

1. A process for utilizing the soot-obtained in the production of synthesis gas in the form of an aqueous soot-containing scrubber waste liquor, which comprises

a) mixing said liquor in a sewage sludge treatment plant with a sewage sludge to which organic flocculants are added as drainage aids with or without a further quantity of finely divided coal or ash, thereby forming a fixture, wherein said liquor is added in an amount sufficient to yield a filter cake having a heating value in the range of about 4600–6300 kJ/kg upon filtration,

b) filtering this sludge mixture, thereby producing a filter cake,

c) incinerating the filter cake thereby producing an ash and

d) burying the incinerated ash in a sanitary landfill.

5,073,272

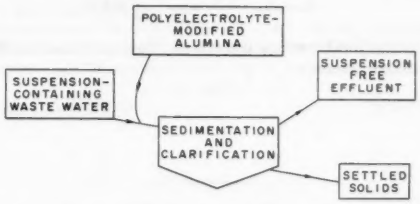
METHOD FOR USING A FLOCCULANT POWDER

Gary A. O'Neill, Lowell, Mass., and John W. Novak, Jr., Murrysville, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 271,536, Nov. 15, 1988, abandoned. This application Feb. 28, 1990, Ser. No. 486,486

Int. Cl.[5] C02F *1/56*

U.S. Cl. 210—728 **24 Claims**



1. A method for reducing the turbidity of an aqueous solution containing colloidal contaminate, said method comprising:

fixedly coating particles of a metal oxide or hydroxide with a polyelectrolyte capable of settling the contaminants to make a dry flocculant powder thereby, said particles having an average surface area of about 100 m^2/g or more, and an average particle size of less than about 30 microns, wherein the dry powder contains at least about 5% by weight of the polyelectrolyte; and

contacting the solution with the dry flocculant powder to reduce said turbidity and settle said contaminants out of the solution said polyelectrolyte remaining substantially adhered to the particles during the settling of said contaminants.

5,073,273

TREATMENT OF AZIDE CONTAINING WASTE

Raj K. Gupta, Moorpark; Morton L. Kraft, La Palma, both of Calif., and William B. Coleman, Mesa, Ariz., assignors to TRW Vehicle Safety Systems, Inc., Lyndhurst, Ohio

Filed May 22, 1991, Ser. No. 703,910

Int. Cl.[5] C02F *1/78*

U.S. Cl. 210—760 **11 Claims**

11. A process for treating a gas generating material waste which contains an azide having the formula XN_3, where X is an alkali metal, and a water insoluble metal oxide reactable with said azide, comprising the steps of:

preparing an aqueous slurry containing said waste and having a pH more than about 9;

treating said aqueous slurry with a gaseous stream containing oxygen and ozone for a time, and with an amount of ozone, effective to oxidize said azide to nitrogen and nitrate ions in solution; and

separating said metal oxide from said solution.

5,073,274

LIQUID DETERGENT CONTAINING CONDITIONING AGENT AND HIGH LEVELS OF ALKYL SULFATE/ALKYL ETHOXYLATED SULFATE

Debra S. Caswell, Cincinnati, Ohio, assignor to The Procter & Gamble Co., Cincinnati, Ohio

Continuation of Ser. No. 309,470, Mar. 13, 1989, abandoned, which is a continuation of Ser. No. 153,173, Feb. 8, 1988, Pat. No. 4,857,213. This application Apr. 30, 1990, Ser. No. 522,414

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

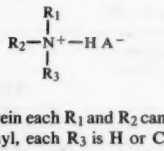
Int. Cl.[5] D06M *10/08*; C11D *7/32*

U.S. Cl. 252—8.6 **17 Claims**

1. A liquid detergent composition comprising:

(a) from 5.0% to about 40% of a surfactant component, said surfactant component containing surfactants selected from the group consisting of alkyl sulfates, alkyl ethoxylated sulfates having an average of less than about 4.0 ethoxylate groups per alkyl sulfate molecule, and mixtures of alkyl sulfates and alkyl ethoxylated sulfates, said mixtures having an average of less than about 4.0 ethoxylate groups per molecule of said surfactants;

(b) from about 0.1% to about 20% of water-insoluble conditioning particles having an average diameter of from about 10 microns to about 500 microns, said particles comprising an amine-organic anion ion-pair complex having the formula:



wherein each R_1 and R_2 can independently be C_{12}–C_{20} alkyl or alkenyl, each R_3 is H or CH_3, and A is an organic anion selected from the group consisting of aryl sulfonates, alkylaryl sulfonates comprising a C_1–C_5 alkyl, dialkyl sulfosuccinates, alkyl oxybenzene sulfonates, acyl isethionates, acylalkyl taurates, and mixtures of said ion-pair complexes; and

(c) a liquid base; said detergent composition having a pH of between about 5 and about 10.

5,073,275

FIBER-TREATMENT AGENT

Isao Ona; Masaru Ozaki, and Hidetoshi Kurusu, all of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,760

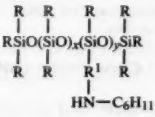
Claims priority, application Japan, May 26, 1988, 63-129086

Int. Cl.[5] D06M *10/08*; C07F *7/04*

U.S. Cl. 252—8.6 **16 Claims**

1. A fiber-treatment agent composition comprising

(A) 100 to 0.1 weight percent of an organopolysiloxane with the general formula



where, in the formula, R is a monovalent hydrocarbon group, R^1 is a divalent hydrocarbon group, $-C_6H_{11}$ is a cyclohexyl group, x=200 to 2,000, and y=1 to 100, and

(B) 0 to 99.9 weight percent polydiorganosiloxane which does not contain nitrogen atom-substituted monovalent hydrocarbon groups.

5,073,276

POLYMER ARTICLE OF MANUFACTURE

John C. Newlove, Kingwood; Lee A. McDougall, Houston, both of Tex.; John R. Walker, Halifax, and John R. Stockwell, Bradford, both of England, assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 101,618, Nov. 13, 1987, abandoned, which is a continuation of Ser. No. 758,630, Jul. 11, 1985, abandoned. This application Jan. 3, 1989, Ser. No. 294,895

Claims priority, application United Kingdom, Nov. 25, 1983, 8331546; PCT Int'l Appl., Nov. 20, 1984, PCT/US84/01871

The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.

Int. Cl.[5] E21B *41/02*

U.S. Cl. 252—8.551 **12 Claims**

1. A particulate treating material for an environment including a hydrocarbon liquid, each particle of the material comprising:

(a) a body composed of a copolymer prepared by suspension polymerization of a monomer mixture of

(i) a first monomer selected from the group consisting of acrylic alkyl esters, styrene, acrylonitrile, and mixtures thereof;

(ii) a second monomer selected from the group consisting of methacrylic acid, hydroxyalkyl acrylates, hydroxyalkyl methacrylates, dialkylaminoalkyl acrylates, dialkylaminoalkyl methacrylates, and mixtures thereof;

said copolymer being insoluble in hydrocarbon liquid, having a softening point above 30° C., having structural integrity, internal porosity, and a particle size of at least 100 microns and less than 2 millimeters; and

(b) a reagent soluble in hydrocarbon liquid and being dispersed in said body, said reagent constituting at least 5 wt % and not more than 30 wt % based on the combined weights of the body and reagent, said reagent being added to, and soluble in, the monomer mixture and insoluble in the copolymer and being selected from the group consisting of scale inhibitors, corrosion inhibitors, biocides, foamers, and oxygen scavengers, and being leachable, at least in part, by a hydrocarbon liquid permeating said body, said body retaining its structural integrity without the reagent.

5,073,277

LUBRICANTS CONTAINING AMMONIUM SALTS OF METHYLPHOSPHONIC ACID

Hermann O. Wirth, Bensheim, and Klaus Müller, Lörrach, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

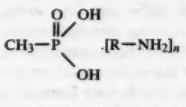
Division of Ser. No. 343,222, Apr. 26, 1989, Pat. No. 4,962,227, which is a division of Ser. No. 161,374, Feb. 22, 1988, Pat. No. 4,847,457, which is a division of Ser. No. 18,855, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 702,294, Feb. 15, 1985, abandoned. This application Jul. 26, 1990, Ser. No. 558,974

Claims priority, application Switzerland, Feb. 24, 1984, 911/84

Int. Cl.[5] C10M *137/12*, *137/14*

U.S. Cl. 252—32.7 R **1 Claim**

1. A lubricant composition consisting essentially of a lubricant and as an extreme pressure and antiwear additive, an effective amount of a compound of the formula



wherein n is an integer from 1.0 to 2.2 and R is a straight chain or branched C_8–C_{30} alkyl which may be interrupted by 1 to 5 sulfur atoms, or R is a straight chain or branched C_8–C_{30} alkenyl.

5,073,278

LUBRICANT COMPOSITION

Rolf Schumacher; Samuel Evans, and Paul Dubs, all of Marly, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 13, 1989, Ser. No. 380,563
Claims priority, application Switzerland, Jul. 18, 1988, 2737/88
Int. Cl.[5] C10M *133/40*
U.S. Cl. 252—47.5 12 Claims

1. A lubricant composition which comprises

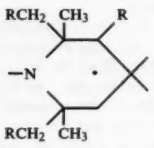
(A) a mineral or synthetic base oil or a mixture of such oils,

(B) at least one aromatic amine of the formula I

(I)

in which R^1 is C_1–C_{18}alkyl, C_7–C_9phenylalkyl, C_5–C_{12}cycloalkyl, phenyl, C_7–C_{18}alkylphenyl, C_7–C_{18}alkoxyphenyl or naphthyl, R^2 is phenyl, C_7–C_{18}-alkylphenyl, C_7-C_{18}alkoxyphenyl or naphthyl, R^3 is hydrogen, C_1–C_{12}alkyl, benzyl, allyl, methallyl, phenyl, or a group $—CH_2SR^4$, R^4 is C_4–C_{18}alkyl, $—CH_2COO(C_4–C_{18}alkyl)$ or $—CH_2CH_2COO(C_4–C_{18}alkyl)$, and

(C) at least one sterically hindered amine contain at least one trivalent group of the formula III



(III)

in which R is hydrogen or methyl.

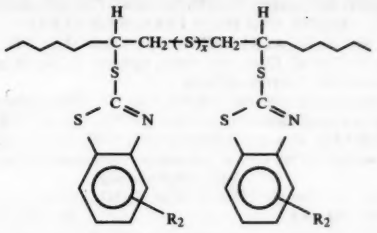
5,073,279

SULFUR COUPLED HYDROCARBYL DERIVED MERCAPTOBENZOTHIAZOLE ADDUCTS AS MULTIFUNCTIONAL ANTIWEAR ADDITIVES AND COMPOSITIONS CONTAINING SAME

Liehpao O. Farng, Lawrenceville; Andrew G. Horodysky, Cherry Hill, both of N.J., and James G. Murray, Whiting, Vt., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Sep. 27, 1989, Ser. No. 413,150
Int. Cl.[5] C10M *135/136*
U.S. Cl. 252—47 44 Claims

1. A composition comprising a major amount of an oil of lubricating viscosity or grease prepared therefrom and a minor multifunctional antioxidant, antiwear, anticorrosion amount of from about 0.001 to about 10 wt. % based on the total weight of the composition of an additive reaction product comprising a sulfur coupled hydrocarbyl mercaptobenzothiazole made by reacting (a) a C_6–C_{60} long-chain olefin with (b) a sulfur reactant and thereafter reacting the sulfur coupled intermediate product of (a) and (b) with (c) a mercaptobenzothiazole and wherein the molar quantities of the sulfurized olefin products of (a) and (b) to mercaptobenzothiazole vary from about 1:10 to about 10:1 and the temperature varies from ambient to about 250° C. with ambient or autogenous pressure and wherein the sulfur coupled hydrocarbyl mercaptobenzothiazole product has the following generalized structure:



wherein R_2 is hydrogen or C_1–C_{40} hydrocarbyl and optionally contains sulfur, nitrogen and/or oxygen and x is an integer of from 1 to about 8.

5,073,280

COMPOSITION FOR INHIBITING STRESS CRACKS IN PLASTIC ARTICLES AND METHODS OF USE THEREFOR

Charles E. Rossio, Carleton, and Theodore E. Anderson, Grosse Ile, both of Mich., assignors to Diversey Corporation, Mississauga, Canada

Continuation-in-part of Ser. No. 398,542, Aug. 25, 1989, Pat. No. 5,009,801, which is a continuation-in-part of Ser. No. 218,893, Jul. 14, 1988, Pat. No. 4,929,375. This application Jun. 8, 1990, Ser. No. 535,473
The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.
Int. Cl.[5] C10M *173/02*
U.S. Cl. 252—49.3 15 Claims

1. A method of inhibiting stress cracking in a poly(alkylene terephthalate) article, comprising the step of applying a composition comprising an amine to a surface of the article, the amine having at least 6 carbon atoms.

5,073,281

PELLETIZED RICE HULL ASH AND BENTONITE CLAY INSULATION

John R. Paules, 10180 Woodbury Dr., and William R. Curran, 10152 Woodbury Dr., both of Wexford, Pa. 15090

Filed May 8, 1989, Ser. No. 348,809
Int. Cl.[5] F04B *1/74;* C04B *14/00, 35/02*
U.S. Cl. 252—62 8 Claims

1. A rice hull ash pellet product comprising an absorbent pellet consisting essentially of rice hull ash and bentonite clay binder wherein said bentonite clay binder contains approximately 58–64% SiO_2, 18–21% Al_2O_3, 2.5–2.8% Fe_2O_3/FeO, 2.5–3.2% MgO, 0.1–1.0% CaO, 1.5–2.7% Na_2O, 0.2–0.45% K_2O, and 4.5–9.0% free H_2O, and further wherein the pelletized product contains about 87.5–96% by weight rice hull ash, about 3–8% by weight bentonite clay, up to 2% by weight cornstarch, and about 1–2.5% by weight water.

5,073,282

ELECTRORHEOLOGICAL FLUIDS

Syed M. Ahmed, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Apr. 21, 1989, Ser. No. 341,441
Int. Cl.[5] C10M *169/04;* C09K *3/00*
U.S. Cl. 252—77 13 Claims

1. An electrorheological fluid consisting essentially of a dispersion of solid hydrophobic polymer particles containing a polar liquid selected from the group consisting of dimethylsulfoxide and N-methylformamide in an electrically insulating fluid containing a steric stabilizer polymer that has an affinity for the hydrophobic polymer particles, said hydrophobic polymer being selected from the group consisting of acrylate, methacrylate, styrene, vinyl acetate, vinyl chloride and acrylo-

nitrile polymers and said steric stabilizer being selected from the group consisting of homopolymers and copolymers of methyl methacrylate, vinyl acetate, 12-hydroxystearic acid and lauryl methacrylate.

5,073,283

ANTIFREEZE COMPOSITION CONCENTRATE CONTAINING OXYALKYLENE COMPOUND AND AN ORGANIC PHOSPHATE SURFACE MODIFIER COMPOUND

Errol D. Goddard, Haworth, N.J., Pak S. Leung, Highland Mills, N.Y., and assignors to First Brands Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 633,342, Jul. 23, 1984, abandoned. This application Apr. 10, 1989, Ser. No. 336,530

Int. Cl.[5] C09K 5/00

U.S. Cl. 252—78.5 2 Claims

1. An antifreeze composition concentrate comprising:

(a) alcohol

(b) at least one oxyalkylene compound of the formula:

$$R'O(X)_nR''$$

wherein R′ and R″ are hydrogen or an organic radical having 1 to 24 carbons, and where n is an integer between 1 and 100, wherein x is an alkyleneoxy radical or mixture of alkyleneoxy radicals made from the corresponding monomer or co-monomer and having from two to six carbon atoms, with the proviso that when said oxyalkylene compound has an EO content of less than about 50 wt. percent of X, the molecular weight of said compound must be less than about 900,

(c) at least one surface modifier compound consisting of an organic derivative of phosphate, wherein the organic group is selected from the class consisting of the following radicals: alkyl, aryl, alkylaryl, arylalkyl, alkyleneoxy, polyalkyleneoxy, and present in an amount sufficient to provide improved corrosion resistance by surface modification of the metal surfaces to allow said oxyalkylene compound to form a film on the surface-modified metal surfaces, and

(d) wherein said antifreeze composition concentrate has a cloud point between about 40° C. and about 125° C. when additionally containing water in an amount to make a diluted working antifreeze.

5,073,284

PHOSPHONITRILIC MIXED ESTERS

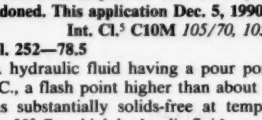
W. Dirk Klobucar, and Charles H. Kolich, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

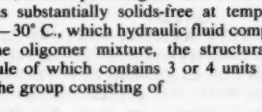
Continuation-in-part of Ser. No. 447,553, Dec. 7, 1989, abandoned. This application Dec. 5, 1990, Ser. No. 624,877

Int. Cl.[5] C10M 105/70, 105/74

U.S. Cl. 252—78.5 10 Claims

1. A hydraulic fluid having a pour point as low as about −42° C., a flash point higher than about 200° C., and which remains substantially solids-free at temperatures as low as about −30° C., which hydraulic fluid comprises a cyclic phosphazene oligomer mixture, the structural formula of each molecule of which contains 3 or 4 units selected at random from the group consisting of





wherein R is a fluoroalkoxy group $-OCH_2(CF_2)_mCF_2Z$, where Z is hydrogen or fluorine, and m is 0 or an integer from 1 to 10; R′ and R″ are different alkoxyalkyloxy groups in which linear or branched C_{1-12} alkoxy is substituted with linear or branched C_{1-12} alkoxy; with the proviso that all of R, R′ and R″ are present in the oligomer mixture.

5,073,285

STABLY SUSPENDED ORGANIC PEROXY BLEACH IN A STRUCTURED AQUEOUS LIQUID

Patricia Liberati, Valley Cottage, N.Y.; Jack T. McCown, Cresskill, N.J.; Michael Aronson, West Nyack, N.Y., and Johannes C. van de Pas, Vlaardingen, Netherlands, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 364,946, Jun. 12, 1989. This application Aug. 6, 1990, Ser. No. 563,451

Int. Cl.[5] C11D 7/35, 7/56

U.S. Cl. 252—94 2 Claims

1. A structured aqueous heavy duty liquid cleaning composition concentrate comprising:

(1) about 1 to 40% by weight of the concentrate of a solid, particulate, substantially water-insoluble organic peroxy acid;

(2) about 10 to 50% by weight of the concentrate of a surfactant;

(3) about 1 to 40% by weight of the concentrate of a pH adjusting system which produces a pH in the concentrated composition of about 3–6 and upon dilution of the concentrated composition produces a dilute solution pH of about 7–9;

(4) from 0.1 to 5% of the concentrate of a stability enhancing polymer which is a copolymer of a hydrophilic and a hydrophobic monomer, said hydrophilic monomer being selected from the group consisting of the acid or salt derivatives of maleic anhydride, acrylic acid, methacrylic acid and analogues or acrylic acid where the carboxylate group is replaced by anionic moieties selected from the group consisting of sulfonate, sulfate, phosphonate and mixtures thereof; said hydrophobic monomer being a hydrophilic monomer functionalized with a hydrophobic moiety selected from the group consisting of fatty amides, fatty esters, fatty alkoxylates, C_{8-22} alkyls, alkylaryls and mixtures thereof or a C_{8-22} alkyl or alkylaryl chain formed by reaction with an α olefin.

5,073,286

STABLE ALKYL AND/OR ARYL SILYL ETHER CAPPED POLYETHER SURFACTANTS FOR LIQUID CLEANING AGENTS CONTAINING HYPOHALITE BLEACHES

Jay G. Otten, Flat Rock; Edward J. Parker, Riverview, and Michael G. Kinnaird, Dearborn, all of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Nov. 20, 1989, Ser. No. 438,312

Int. Cl.[5] C07F 7/02, 7/08; C11D 1/82, 9/36

U.S. Cl. 252—97 19 Claims

1. A liquid chlorine bleach stable polyether surfactant having the general formula:

$$Y[(A_1O)_n(A_2O)_m(A_3O)_p(X)_qA_4]_z$$

wherein Y is the residue of an organic compound having from 1 to 8, reactive hydrogens as measured by the Zerevitinov determination method; z is a number from 1 to 8, A_1, A_2 and A_3 are C_2 to C_4 alkylene groups, tetramethylene, and mixtures thereof; n+m+p are numbers such that the total molecular weight of the uncapped portion of the molecule is from about 500 to 25,000, said uncapped portion of the molecule having hydrophilic and hydrophilic moieties such that the molecular weight of the hydrophile is from 5 to 35 weight percent of the total molecular weight and the total molecular weight of the hydrophobe is from 65 to 95 weight percent of the total molecular weight; and X is a hydrocarbon residue containing 2 to 30

carbon atoms q is a number from 0 to 1, A_4 is a Si R'_3 group wherein R' is a C_1 to C_{30} alkyl, a C_1 to C_{30} oxyalkyl, a C_6 to C_{30} aryl group, and mixtures thereof.

5,073,287

COATING REMOVER AND PAINT STRIPPER CONTAINING N-METHYL-2-PYRROLIDONE, METHANOL, AND SODIUM METHOXIDE

Wayne Harelstad, Bloomington, Minn., assignor to Fremont Industries, Inc., Shakopee, Minn.

Filed Jul. 16, 1990, Ser. No. 552,573

Int. Cl.[5] C09D *9/00*; C11D *7/32*

U.S. Cl. 252—153 **4 Claims**

1. A paint stripper composition for the removal of organic coatings from the surface of metallic substrates consisting of the following formulation:

Component	Percent by Weight
(a) sodium methoxide activator;	1–10%
(b) a coupling agent and co-solvent consisting of methanol; and	10–20%
(c) an aprotic polar solvent consisting of N-methyl-2-pyrrolidone	70–89%

5,073,288

COMPOSITIONS OF 1,1,1,2,2,3,5,5,5-NONAFLUORO-4-TRIFLUOROMETHYLPENTANE AND USE THEREOF FOR CLEANING SOLID SURFACES

Douglas R. Anton, Claymont, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 17, 1990, Ser. No. 569,354

Int. Cl.[5] C11D *7/30, 7/50*; C23G *5/028*; B08B *3/00*

U.S. Cl. 252—162 **37 Claims**

1. A cleaning composition consisting essentially of (i) between 5 and 99 percent by weight 1,1,1,2,2,3,5,5,5-nonafluoro-4-trifluoromethylpentane and (ii) at least about 1 percent by weight of at least one solvent selected from the group consisting of alcohols containing from 1 to 4 carbon atoms, esters containing from 3 to 6 carbon atoms, ethers containing from 2 to 6 carbon atoms, ketones containing from 3 to 6 carbon atoms, halogenated hydrocarbons containing from 1 to 4 carbon atoms wherein the halogen is chlorine or both chlorine and fluorine, acetonitrile, and nitromethane.

5,073,289

PAINT STRIPPER COMPOSITION HAVING REDUCED VOLATILITY CONTAINING DECANOLACTONE, N-METHYLPYRROLIDONE AND BUTYROLACTONE AND METHOD OF USE

Harvest L. Collier; Gary L. Bertrand, and Raymond L. Venable, all of Rolla, Mo., assignors to The Curators of the University of Missouri, Rolla, Mo.

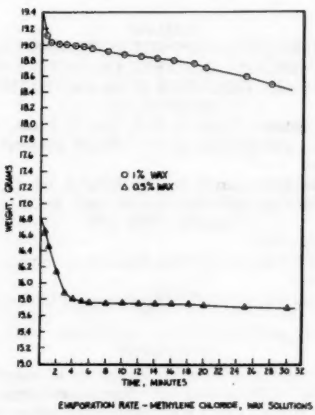
Continuation of Ser. No. 430,887, Nov. 2, 1989. This application Apr. 5, 1990, Ser. No. 505,841

Int. Cl.[5] C09D *9/00*; C11D *7/22, 7/50*

U.S. Cl. 252—162 **6 Claims**

1. An improved composition useful for stripping cured coatings of paint, varnish and other like coatings with a formulation comprising:

(a) methylene chloride;



EVAPORATION RATE – METHYLENE CHLORIDE, WAX SOLUTIONS

(b) a wax; and

(c) decanolactone for reducing the evaporation rate of said methylene chloride.

5,073,290

COMPOSITIONS OF 1,1,1,2,2,5,5,5-OCTAFLUORO-4-TRIFLUORMETHYPENTANE AND USE THEREOF FOR CLEANING SOLID SURFACES

Douglas R. Anton, Claymont, and Frank J. Weigert, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 17, 1990, Ser. No. 568,807

Int. Cl.[5] C11D *7/30, 7/50*; C23G *5/028*; B08B *3/00*

U.S. Cl. 252—162 **20 Claims**

1. A cleaning composition consisting essentially of (i) between 5 and 99 percent by weight 1,1,1,2,2,5,5,5-octafluoro-4-trifluoromethylpentane and (ii) at least about 1 percent by weight of at least one solvent selected from the group consisting of alcohols containing from 1 to 4 carbon atoms, esters containing from 3 to 6 carbon atoms, ethers containing from 2 to 6 carbon atoms, ketones containing from 3 to 6 carbon atoms, halogenated hydrocarbons containing from 1 to 4 carbonatoms wherein the halogen is chlorine or both chlorine and fluorine, acetonitrile, and nitromethane.

5,073,291

AZEOTROPE-TYPE SOLVENT MIXTURE OF METHANOL AND 1,4-DIHYDROPERFLUOROBUTANE AND PROCESS FOR CLEANING ELECTRONIC COMPONENTS WITH THE AID OF THE SAME

Horst Robeck; Hans-Matthias Deger, both of Hofheim am Taunus, and Klaus Raab, Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 23, 1991, Ser. No. 644,512

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1990, 4002120

Int. Cl.[5] C11D *7/30, 7/50*; C23G *5/028*; B06B *3/00*

U.S. Cl. 252—171 **6 Claims**

1. An azeotrope-type solvent mixture which contains about 3–5% by weight of methanol and 95–97% by weight of 1,4-dihydroperfluorobutane

5,073,292

HEAVY DUTY LIQUID DETERGENT COMPOSITIONS CONTAINING ENZYMES STABILIZED BY QUATERNARY NITROGEN SUBSTITUTED PROTEINS

John F. Hessel, Metuchen, N.J.; Michael P. Aronson, West Nyack, N.Y.; Martin S. Cardinali, Millington, and Howard B. Kaiserman, Cliffside Park, both of N.J., assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Jun. 7, 1990, Ser. No. 534,780
Int. Cl.[5] C11D *3/386, 3/37*
U.S. Cl. 252—174.12 19 Claims

1. A liquid detergent composition comprising:

(a) 5–85% by weight of a surfactant selected from the group consisting of anionic, nonionic, cationic, ampholytic or zwitterionic surfactants and mixtures thereof;

(b) an effective amount of enzyme selected from the group consisting of protease lipase and mixtures thereof; and

(c) about 0.01 to about 10% of a protein containing quaternary nitrogen substituents wherein the protein has the following structure;

$$\text{protein } Y\text{—}R_1\text{—}\overset{+}{N}(R_2)(R_3)(R_4)A^-;$$

wherein protein is a native or hydrolyzed protein;

Y is a reactive amino acid;

R_1 is a saturated or unsaturated alkyl, aryl, alkaryl, amido, alkylamine, alkoxy or alkanol group having 0 to 20 carbon atoms;

R_2, R_3 and R_4 are saturated or unsaturated alkyl, aryl, alkaryl, amido, alkylamine, alkoxy, alkanol, alkylcarboxylate, alkylsulfate, alkylsulfonate, arylsulfonate or arylsulfate groups having 1 to 20 carbon atoms; and

A^- is a neutralizing anion.

5,073,293

MILD DETERGENT COMPOSITIONS CONTAINING ALKYLGLYCOSIDE AND DICARBOXYLIC ACID SURFACTANTS

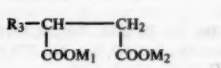
Katsuhiko Deguchi; Kozo Saito, and Hiroyuki Saijo, all of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,630
Claims priority, application Japan, Sep. 20, 1988, 63-236134
Int. Cl.[5] C11D *3/22, 1/04, 1/52*
U.S. Cl. 252—174.17 5 Claims

1. A detergent composition consisting essentially of:

(a) an alkyl glycoside,

(b) one or more dicarboxylic acid surface active agents of the following formulae (II), (III), (IV), and (V):



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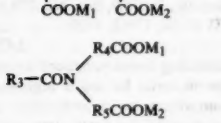

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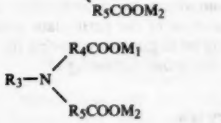

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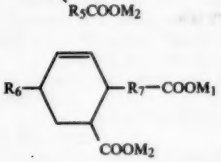


(V)

wherein R_3 is a linear or branched, alkyl or alkenyl group having 8–16 carbon atoms, R_4 and R_5 each individually represents a group $-(CH_2CH_2O)_n-(CH_2)_m$ (m is a value of 1–5 and n is a value of 0–5), R_6 is an alkyl group having 3–12 carbon atoms, R_7 is an alkylene group having 1–12 carbon atoms, provided that the total carbon atom content in R_6 and R_7 groups is 6–22, and M_1 and M_2 each individually represents a hydrogen atom, an alkali metal, an alkaline earth metal, or an alkanolamine; and wherein the ratio (b)/(a) by weight is 1/600–1/1 and the content of components (a) and (b) is 1–60% by weight; (c) water; and (d) one or more additives selected from the group consisting of surface active agents, lower aliphatic alcohols, solubilizing agents, moisturizing agents, perfumes, coloring agents, preservatives and antifungal agents.

5,073,294

PROCESS OF PREPARING COMPOSITIONS HAVING MULTIPLE ORIENTED MESOGENS

Paul J. Shannon, Exton, Pa.; Shao-Tang Sun, Newark, and Brian J. Swetlin, Wilmington, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 490,115, Mar. 7, 1990. This application Oct. 29, 1990, Ser. No. 605,724
Int. Cl.[5] C09K *19/52, 19/56;* G02F *1/13*
U.S. Cl. 252—299.01 24 Claims

1. A process for preparing a composition in the form of a film or fiber, which process comprises aligning in a multi-oriented state a nematic or smectic monomeric mesophase and photopolymerizing the mesophase into a polymeric film or fiber having mesogens in one region aligned with their molecular axes oriented in a different direction than the mesogens aligned in at least one other region, wherein the orientation of the mesogens in at least one of the corresponding regions of the monomeric mesophase is induced by linearly polarized light.

5,073,295

ENCAPSULATED FLUORESCENT WHITENING AGENT, PHOTOATIVATOR OR ANTI-MICROBIAL AGENT

Beat Bruttel, Böckten, and Petr Kvita, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 286,547, Dec. 19, 1988, Pat. No. 4,961,755. This application Jul. 3, 1990, Ser. No. 547,715
Claims priority, application Switzerland, Dec. 29, 1987, 5092/87
Int. Cl.[5] C09B *67/02;* C11D *3/39;* D06L *3/12;* B01J *2/30*
U.S. Cl. 252—301.19 15 Claims

1. A coated active substance comprising at least one fluorescent whitening agent, photoactivator or textile microbiocide, in conjunction with optional extenders, dispersants, buffers, stabilizers or other auxiliaries and a coating material, wherein the coating material is a substance or mixture of substances which has a melting point of over 40° C. and dissolves or disperses rapidly in water in the temperature range from 10° to 30° C. and/or melts in the temperature range from 40° to 130° C., which coating material comprises a block copolymer of ethylene oxide and propylene oxide or an ethoxylated stearyl-diphenyl-oxyethyl diethylenetriamine.

5,073,296

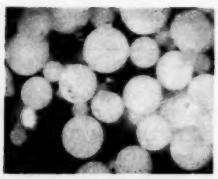
PREPARATION OF DISCRETE MICRODROPLETS OF AN OIL IN WATER

Stephen L. Kopolow, Plainsboro, and William J. Burlant, Wayne, both of N.J., assignors to ISP Investments Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 510,017, Apr. 17, 1990, abandoned. This application Oct. 29, 1990, Ser. No. 604,263

Int. Cl.[5] B01J *13/00*

U.S. Cl. 252—312 32 Claims



1. A method for stabilizing an oil in water which comprises dispersing the oil in water as microdroplets, adding a water-soluble vinyl monomer and a free radical polymerization initiator thereto, and in situ polymerizing said monomer whereby the oil microdroplets are stabilized in the resulting polymer solution.

5,073,297

CATION-ACTIVE EMULSIFIER

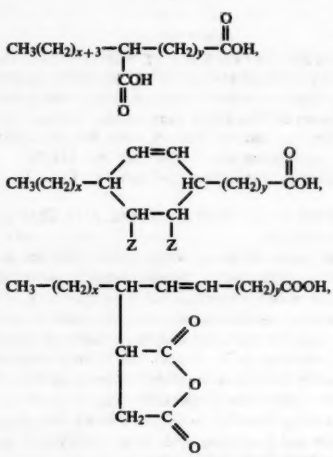
Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 324,106, Mar. 16, 1989, Pat. No. 4,957,560, which is a continuation of Ser. No. 182,874, Apr. 18, 1988, Pat. No. 4,861,377. This application Nov. 15, 1989, Ser. No. 436,608

Int. Cl.[5] B01F *17/16, 17/22, 17/50*

U.S. Cl. 252—355 2 Claims

1. A composition of matter obtained by reacting, at 230°–250° C., two moles modified polyamine with one mole of a member of the group consisting of polycarboxylic acids and anhydrides of the following general formulae:



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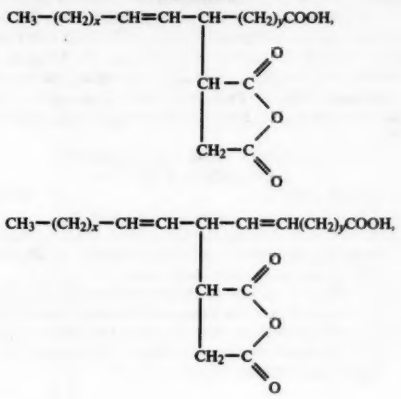
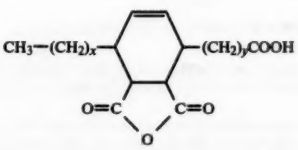


and



wherein x and y are integers from 3 to 9, x and y together equal 10–14, at least one Z is a carboxylic acid group and any remaining Z is hydrogen, and wherein the modified polyamine is formed by a Michael addition reaction of a polyalkylene amine with a 1,2-unsaturated acid able to undergo Michael addition of the amines across the double bonds producing amino acids which can undergo polymerization to low and high molecular weight amino polyamides.

2. The composition of claim 1 obtained by co-reacting the member with kraft lignin, desulfonated lignosulfonates, or dimerized fatty acids prior to their reaction with the modified polyamines.

5,073,298

ANTIMICROBIAL ANTIFOAM COMPOSITIONS AND METHODS

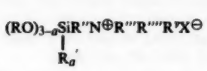
Thomas M. Gentle, Sanford, and William C. White, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 221,581, Jul. 20, 1988, abandoned. This application Jul. 7, 1989, Ser. No. 378,563

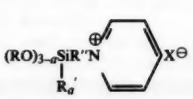
Int. Cl.[5] B01D *19/04;* C09K *3/00*

U.S. Cl. 252—358 2 Claims

1. In an antifoam for destabilizing foams produced by surfactants including a particulate material having a high surface area, the improvement comprising an antimicrobial agent chemically bonded to the surface of the particulate material, the antimicrobial agent being an organosilane having the general formula selected from the group consisting of



and



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wherein, in each formula,

R is an alkyl radical of 1 to 4 carbon atoms or hydrogen;

a has a value of 0, 1 or 2;

R′ is a methyl or ethyl radical;

R″ is an alkylene group of 1 to 4 carbon atoms;

R‴ and R⁗ are each independently selected from the group consisting of alkyl radicals of 1 to 18 carbon atoms, $-CH_2C_6H_5$, $-CH_2CH_2OH$, $-CH_2OH$, and $-(CH_2)_xNHC(O)R^{vi}$, wherein x has a value of from 2 to 10 and R^{vi} is a perfluoroalkyl radical having from 1 to 12 carbon atoms;

R^v is selected from the group consisting of alkyl radicals of 16 or 18 carbon atoms, $-CH_2C_6H_5$, $-CH_2CH_2OH$, $-CH_2OH$, and $-(CH_2)_xNHC(O)R^{vi}$, wherein x has a value of from 2 to 10 and R^{vi} is a perfluoroalkyl radical having from 1 to 12 carbon atoms; and

X is chloride, bromide, fluoride, iodide, acetate or tosylate.

5,073,299

TELOMERIC COMPOUND

Barry Cook, Manchester, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

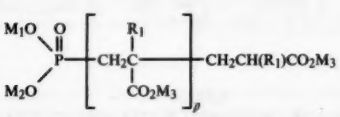
Filed Sep. 19, 1989, Ser. No. 409,225

Claims priority, application United Kingdom, Sep. 21, 1988, 8822144

Int. Cl.[5] C23F *11/10*

U.S. Cl. 252—389.23 **12 Claims**

1. A compound having the formula I:



I

wherein M_1, M_2, M_3, independently, are hydrogen, C_1–C_4alkyl, phenyl, a monovalent or an equivalent of a polyvalent metal atom, ammonium or a substituted ammonium ion; R_1 is C_1–C_4alkyl substituted by one or more hydroxy or carboxyl groups and p is an integer.

5,073,300

CORROSION INHIBITORS

Richard L. Veazey, E. Windsor, N.J., and Ewa A. Bardasz, Langhorne, Pa., assignors to Union Camp Corporation, Wayne, N.J.

Division of Ser. No. 206,451, Jun. 14, 1988, Pat. No. 4,946,629. This application Apr. 2, 1990, Ser. No. 503,185

Int. Cl.[5] C23F *11/10*

U.S. Cl. 252—392 **5 Claims**

1. The reaction product of (A) the Diels-Alder adduct of 2,3 and 6,7 poly(alloocimene) and an activated olefin and (B) a polyamine.

5,073,301

PROCESS FOR STABILIZATION OF THE VISCOSITY OF WOOD PULPS

Hans U. Suess, Hasselroth, Fed. Rep. of Germany, and Wilfried Eul, Ramsey, N.J., assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 12, 1990, Ser. No. 551,535

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1989, 3923728

Int. Cl.[5] D21C *3/04*

U.S. Cl. 252—402 **6 Claims**

1. A process for stabilization of the viscosity of wood pulps that have been treated with ozone of ozone and oxygen but not with chlorine during a bleaching sequence comprising treating the wood pulp with formamidinesulfinic acid during an alkaline extraction step.

5,073,302

VARISTOR MATERIAL AND PROCESS FOR PRODUCTION THEREFOR

Akihide Igari, Tokyo, and Zenbee Nakagawa, Kanagawa, both of Japan, assignors to Somar Corporation, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 365,884

Int. Cl.[5] H01B *1/06*

U.S. Cl. 252—518 **2 Claims**

1. A varistor material comprising two crystalline phases of ZnO and $ZnMn_2O_4$, wherein Zn and Mn are present at such a ratio that 3 to 7% by mol of MnO is contained per 100% by mol of ZnO + MnO and the nonlinear index (α) of the varistor properties is at least 10.

5,073,303

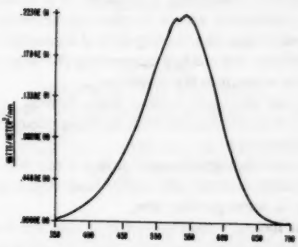
PHOTOCHROMIC EMULSION

Jerome L. Reid, Wayland, Mass., assignor to BSG, Inc., West Newton, Mass.

Division of Ser. No. 209,414, Jun. 20, 1988, Pat. No. 5,015,416. This application Jul. 2, 1990, Ser. No. 547,700

Int. Cl.[5] G02B *5/20*

U.S. Cl. 252—584 **18 Claims**



1. A photochromic emulsion for coating light transmissive materials comprising:

photosensitive silver halide particles having dimensions in the range of approximately 50 Angstroms to 800 Angstroms, said silver halide being surface-sensitized; and

a polymeric colloidal suspending agent for protecting said silver halide particles and reversibly binding halogens produced during photolysis of said silver halide particles.

5,073,304

PROCESS FOR PREPARING FIREPROOF FEATHERS

Tadashi Yamazaki, Hamamatsu, Japan, assignor to Maruhachi Mawata Co., Ltd., Shizuoka, Japan

Filed Aug. 21, 1990, Ser. No. 570,335

Claims priority, application Japan, Aug. 22, 1989, 1-21584

Int. Cl.[5] C09K *21/00*

U.S. Cl. 252—603 **15 Claims**

1. A process for preparing fireproof feathers comprising steps of:

a) suspending a predetermined amount of feathers in water to make a suspension of the feathers;

b) adjusting the pH of the suspension to lie within the range of pH 2–4 with acid to make an acidic suspension;

c) adding tetrabromophthalate derivative which is emulsified in water in advance and a water soluble compound to the acidic suspension, the water soluble compound is selected from the group consisting of zirconium fluoride and titanium fluoride, potassium zirconium fluoride and the hydroacid of titanium fluoride;

d) resuspending and washing the feathers in water; and

e) drying the thus processed feathers.

5,073,305
METHOD OF EVACUATING RADIOACTIVE WASTE TREATING CONTAINER TO VACUUM

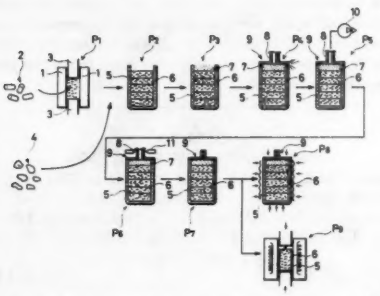
Hidehiko Miyao, Katsuta; Masao Shiotsuki; Shigeyoshi Kawamura, both of Mito, and Fumiaki Komatsu, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe and Doryokuro Kakunenryo, Tokyo, both of, Japan

Filed Aug. 20, 1990, Ser. No. 569,976

Claims priority, application Japan, Sep. 28, 1989, 1-253856

Int. Cl.[5] G21F *9/12*

U.S. Cl. 252—633 **9 Claims**



1. A method of evacuating a container to a vacuum for use in treating radioactive wastes by placing the waste into the container, and evacuating, sealing off and thereafter compressing the container, the method comprising the steps of:

placing the waste into the container,

forming over the waste a filter layer formed substantially entirely of particulate material fulfilling one of the following requirements:

(1) a layer having a thickness of at least 5 mm and formed of a particulate material not smaller than 40 μm to less than 105 μm in mean particle size;

(2) a layer having a thickness of D in mm and formed of a particulate material not smaller than 105 μm to not greater than 210 μm in mean particle size d in μm, the thickness D and the mean particle size d having the relationship represented by:

$$D \geqq (20/105) \times d - 15;$$

thereafter aspirating a gas through the filter layer from thereabove to evacuate the container and sealing off and compressing the container.

5,073,306
OPTICALLY ACTIVE COMPOUND AND LIQUID CRYSTAL COMPOSITION CONTAINING SAME

Hiroyuki Nohira, Urawa; Masanao Kamei, Annaka; Hideki Kanazawa, Yotsukaichi; Yoko Yamada, Atsugi, and Yuko Etoh, Tokorazawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

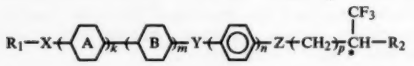
Division of Ser. No. 223,363, Jul. 25, 1988, Pat. No. 4,918,213. This application Jul. 25, 1989, Ser. No. 385,700

Claims priority, application Japan, Jul. 28, 1987, 62-186575; Aug. 18, 1987, 62-204343; Feb. 24, 1988, 63-41456; Mar. 25, 1988, 63-71035; Jul. 6, 1988, 63-166781

Int. Cl.[5] C09K *19/34, 19/52;* **C07D** *239/02;* **G02F** *1/13*

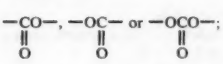
U.S. Cl. 252—299.61 **22 Claims**

1. An optically active compound represented by the following formula (I):

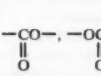


(I)

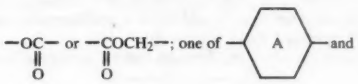
wherein R_1 denotes an alkyl group having 1–18 carbon atoms, R_2 denotes an alkyl group having 1–12 carbon atoms; X denotes a single bond, —O—,

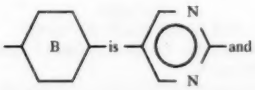


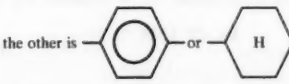
Y denotes a single bond,



—CH_2O— or —OCH_2—; Z denotes —OCH_2—,







C* denotes an asymmetric carbon atom; k, m and n are independently 0, 1 or 2 with proviso that k+m+n is 2 or 3; and p i 1 or 2.

5,073,307
MEMBRANE CARBURETOR FOR AN INTERNAL COMBUSTION ENGINE OF A HANDHELD PORTABLE TOOL

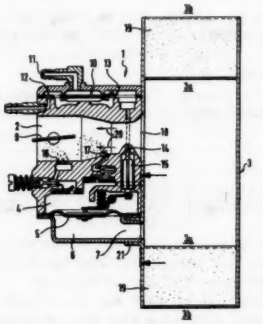
Michael Langer, Fellbach, and Joachim Schommers, Allmersbach i.T., both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Feb. 5, 1990, Ser. No. 475,274

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1989, 3903192

Int. Cl.[5] F02M *17/04*

U.S. Cl. 261—35 **7 Claims**



1. A membrane carburetor for an internal combustion engine such as a two-stroke engine of a portable handheld tool such as a motor chain saw, cutoff machine, brushcutter or the like, the membrane carburetor comprising:

a housing having an interior space and defining an intake channel communicating with the engine and through

which a stream of air is drawn by suction when the engine is operating;

an air filter mounted upstream of said intake channel for filtering and passing said stream of air into said channel;

said air filter having a clean-air side downstream of said filter;

a movable control membrane having two sides and mounted in said space so as to define a fuel chamber on one side of said membrane in which fuel is drawn into said intake channel to form a fuel/air-mixture with said intake air and a closed compensation chamber on the other side of said membrane;

connecting channel means for connecting said compensation chamber to said stream of air at a location downstream of said clean-air side of said air filter;

said membrane having a membrane surface and said connecting channel means being a connecting channel having a channel cross section; and,

said membrane surface and said channel cross section defining a ratio of less than approximately 10:1.

5,073,308

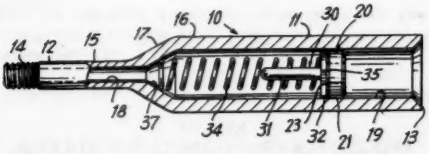
CARBURETOR IDLE JET VENTING DEVICE

McCrea Ferguson, 3606 Jeffrey Dr., Modesto, Calif. 95355

Filed Nov. 13, 1990, Ser. No. 611,886

Int. Cl.[5] F02M *3/055*

U.S. Cl. 261—41.5 **2 Claims**



1. In a device for bleeding ambient air into a carburetor idle fuel port, the device, including a vacuum responsive check valve which opens upon the occurrence of above idle vacuum pressure, the improvement comprising: an elongated hollow body having an axially oriented continuous passage extending between first and second ends; said body having threaded engagement means on said first end for engaging said idle fuel port; a washer-like plug positioned within said passage and forming a valve seat including an outer annular planar surface and a centrally disposed conical portion surrounded by said planar area; a slideably disposed valve element including an axially-oriented stem and a transversely extending generally planar head, said head having inner and outer surfaces, and a compression coil spring surrounding said stem and bearing upon said inner surface; said outer surface of said head overlying said valve seat; whereby, when said valve element is in closed position, sealing is effected solely by the contact of said outer surface with said planar area of said valve seat, and upon the opening thereof, only minimal axial displacement is necessary to provide substantial venting action.

5,073,309

DEVICE FOR DISPERSION OF GAS IN A LIQUID PHASE

Jacques Bousquet, Irigny; Alain Catros, Rillieux La Patte; Le Xuan Huynh, Bruxelles, and Alain Secq, Pont L'Eveque, all of France, assignors to Elf France, Paris, France

PCT No. PCT/FR88/00526, § 371 Date Jul. 21, 1989, § 102(e) Date Jul. 21, 1989, PCT Pub. No. WO89/04208, PCT Pub. Date May 18, 1989

PCT Filed Oct. 27, 1988, Ser. No. 392,952

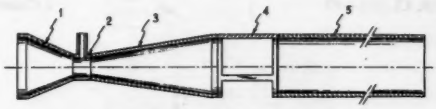
Claims priority, application France, Nov. 3, 1987, 87 15219

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—29 **11 Claims**

1. A device for the dispersion of a gaseous phase in a liquid phase, comprising a venturi ejector, oriented substantially vertically and arranged for downward flow of the liquid phase and immersion in the liquid phase, the venturi ejector comprising:

a convergent nozzle (1) for introduction of the liquid phase, a neck (2) connected to the convergent nozzle at a point of the same internal diameter as the convergent nozzle at the point of connection, the neck having means for the admission of the gas and a divergent nozzle (3) connected to the



neck at a point of the same internal diameter as the neck at the point of connection wherein the divergent nozzle (3) is connected to a perforated cylindrical piece (4) of a diameter equal to the diameter of the exit of the divergent nozzle, having perforations of a length substantially equal to the diameter, the device is extended by an extension piece (5) of a diameter at least equal to the diameter of the perforated cylindrical piece, in communication with the perforated cylindrical piece.

5,073,310

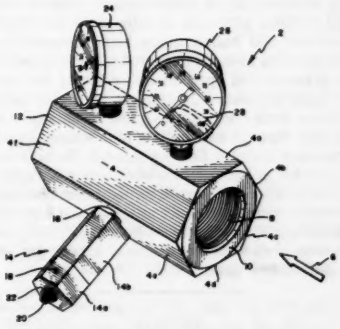
AIR INJECTOR ASSEMBLY

John I. Ramsey, Harrisburg, Pa., assignor to Water Master, Inc., Harrisburg, Pa.

Filed Oct. 1, 1990, Ser. No. 591,679

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—76 **16 Claims**



1. Apparatus for oxidizing a fluid, comprising:

a member through which the fluid traverses having input and output ports for receiving and outputting the fluid respectively;

two bores each connecting said input and output ports to provide respective passageways through said member;

means adapted to one of said bores for injecting air to the fluid traversing through said member; and

comprising a unitary adjustable means having a portion thereof movable within the other of said bores for varying the opening of said other bore to control the amount of fluid traversing therethrough to thereby regulate the pressure of the fluid traversing through said member and effect said air injecting means to inject an appropriate amount of air to the fluid traversing through said member to ensure that adequate oxidation of the fluid takes place.

5,073,311
MULTIPLE-GAS-PHASE LIQUID TREATMENT APPARATUS

Youko Nojima, and Hisatake Nojima, both of Kagoshima, Japan, assignors to Yuugen Kaisha Parasight, Chiba, Japan

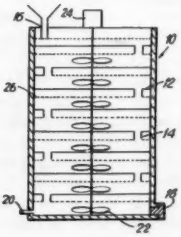
PCT No. PCT/JP89/00416, § 371 Date Aug. 16, 1990, § 102(e) Date Aug. 16, 1990, PCT Pub. No. WO89/10183, PCT Pub. Date Nov. 2, 1989

PCT Filed Apr. 19, 1989, Ser. No. 566,459

Claims priority, application Japan, Apr. 21, 1988, 63-98776

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—93 **2 Claims**



1. Multiple-gas-phase-liquid treatment apparatus comprising a container means having a hollow interior including a top portion, a bottom portion and opposed side walls interconnecting said top and bottom portions; a plurality of horizontal partition plates mounted in said hollow interior to define a plurality of vertically-stacked liquid-treatment chambers; pouring port means connected to said container means for introducing liquid into the top portion of said hollow interior and onto a top one of said partition plates, discharge port means connected to said container means for discharging treated liquid from the bottom portion of said hollow interior, vent port means for introducing gas into the bottom portion of said hollow interior, and hollow tube means comprising a hollow tube connected to each horizontal partition plate and projecting downwardly a predetermined distance from said horizontal partition plate into an adjacent lower liquid treatment chamber, said hollow tubes being connected to said horizontal partition plates in staggered relation to each other at positions adjacent said opposed side walls of said container, whereby liquid introduced into the top portion of said hollow interior flows from one partition plate to an adjacent lower partition plate through said hollow tube means, liquid in one liquid treatment chamber flowing through the hollow tube of its respective horizontal partition plate onto a horizontal partition plate of an adjacent lower liquid treatment chamber, while gas introduced into the bottom portion of said hollow interior accumulates beneath said horizontal partition plates to a height equal to said predetermined distance, excess gas ascending through said hollow tubes.

5,073,312
WATER CARBONATOR SYSTEM

Bruce D. Burrows, Valencia, Calif., assignor to Ebtech, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 562,244, Aug. 3, 1990. This application Apr. 22, 1991, Ser. No. 688,856

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—140.1 **14 Claims**

1. A water carbonator system, comprising:

a reservoir having first and second generally opposite ends;

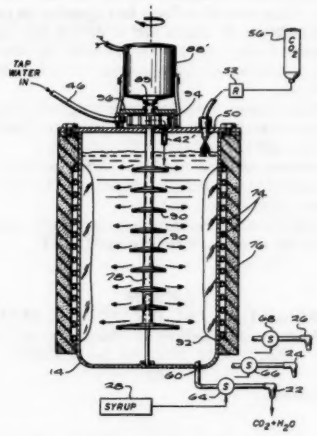
water inlet means including pump means for introducing water into said reservoir generally at said first end thereof;

carbonating gas inlet means for introducing carbonating gas into said reservoir;

dispensing outlet means for drawing carbonated water generally from said second end of said reservoir;

impeller means mounted within said reservoir and including an elongated impeller shaft extending generally between said first and second ends, and a plurality of impeller disks mounted on said shaft in spaced relation to each other; and

drive means having a common drive shaft for rotatably driving said impeller shaft, and for rotatably driving said pump means;



said water inlet means including a water injector nozzle oriented for introducing water into said reservoir in the form of a water jet aimed generally at one of said impeller disks.

5,073,313
PROCESS FOR PRODUCING LOW-DUST-LEVEL POLYCARBONATE MOLDED ARTICLE

Toshikazu Umemura; Makoto Matsumura, both of Osaka; Toshiaki Izumida, and Kazuyuki Akahori, both of Kanagawa, all of Japan, assignors to Mitsubishi Gas Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 25, 1990, Ser. No. 557,236

Claims priority, application Japan, Jul. 25, 1989, 1-192368

Int. Cl.[5] B29C *45/48, 45/60, 45/62*

U.S. Cl. 264—1.1 **4 Claims**

1. In a process for producing a polycarbonate molded article having a low dust level from a polycarbonate resin in the form of a powder or pellets which comprises injection molding said polycarbonate resin using an injection molding machine, the improvement wherein the injection molding machine comprises a cylinder whose inner circumferential wall is made of a corrosion- and abrasion-resistant alloy selected from the group consisting of alloy components (1), (2), and (3) given below and a screw made of a member selected from the group consisting of a steel having a metal coating formed of a member selected from the group consisting of hard chromium plating, a steel having a metal coating formed of hard nickel plating, a steel having a metal coating formed of titanium carbide, a steel having a metal coating formed of tungsten carbide, SUS420, SUS440, Hastelloy C, and a steel comprising alloy components (4) given below:

Alloy components (1):

C: 0.5–1.5 wt %

Si: 1.0–2.0 wt %

B: 0.5–2.5 wt %

Ni: 10.0–20.0 wt %

Cr: 20.0–30.0 wt %

W: 10.0–20.0 wt %

Cu: 0.5–2.0 wt %

Remainder: Co and unavoidable impurities

Alloy components (2):

Ni: 0.0–2.0 wt %

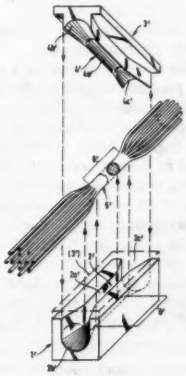
Cr: 5.0–15.0 wt %
Fe: 0.0–1.0 wt %
Mn: 0.1–2.0 wt%
Si: 0.2–4.0 wt %
B: 2.0–4.0 wt %
Remainder: Co and unavoidable impurities,
Alloy components (3):
Cr: 5.0–10.0 wt %
Co: 5.0–40.0 wt %
Fe: 0.0–10.0 wt %
Mn: 0.2–2.0 wt %
Si: 2.0–10.0 wt %
B: 2.0–4.0 wt %
Remainder: Ni and unavoidable impurities,
Alloy components (4):
C: 0.5–1.5 wt %
Cr: 10.0–20.0 wt %
Mo: 1.5–2.5 wt %
V: 0.5–1.5 wt %
Remainder: Fe and unavoidable impurities.

5,073,314

METHOD AND APPARATUS FOR PRODUCING A STAR COUPLER FROM POLYMER OPTICAL WAVEGUIDES

Jochen Coutandin, Langenlonsheim; Werner Groh, Lich; Peter Herbrechtsmeier, Königstein/Taunus, and Jürgen Theis, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 11, 1990, Ser. No. 535,825
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1989, 3919263
Int. Cl.[5] B29D *11/00*
U.S. Cl. 264—1.5 **3 Claims**



1. A method of producing a star coupler from polymer optical waveguides by simultaneous ordering and clustering of the optical waveguides and bonding of the same in an apparatus having a male die and a lower part with a channel, wherein the optical waveguides freed of cladding at the bonding point are laid in parallel in the channel in the middle region of the lower part of the apparatus, which channel corresponds to the later shape of the star coupler, wherein the optical waveguides are fused by heat and pressure by pressing of the male die into the lower part of the apparatus.

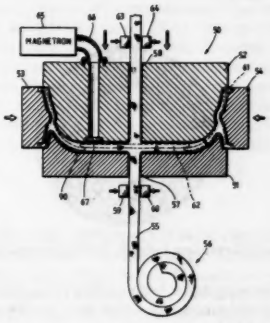
2. An apparatus for producing a star coupler from polymer optical waveguides, comprising a lower part with a channel located therein, said channel is comprised of a parallel middle section and two conical side sections, and an upper part with a male die, which corresponds in its shape to the channel and is comprised of a parallel middle section and two conical side sections.

5,073,315

METHODS FOR MAKING FIBER REINFORCED WHEELS AND OTHER STRUCTURAL MOLDINGS

Peter C. Bertelson, 30325 Ponds View Dr., Franklin, Mich. 48025

Filed Dec. 19, 1989, Ser. No. 453,618
Int. Cl.[5] B60B *3/12*; **B29C** *43/18*
U.S. Cl. 264—25 **9 Claims**



1. A method of making a fiber reinforced resin article comprising oriented reinforcing fibers, said method comprising the steps of:

(a) placing said reinforcing fibers and resin in a mold;

(b) curing said resin in said mold to form said article; and

(c) removing said article from said mold,

wherein said method further comprises orienting said reinforcing fibers by contracting a tubular braid of said reinforcing fibers along an axis of said braid and expanding said braid radially with respect to said axis of said braid.

5,073,316

PROCESS FOR PRODUCING A POROUS FILM

Kunio Bizen, Kurashiki; Minoru Kashino, Yokohama; Tasuku Suzuki, Kurashiki; Ryuichi Hasegawa, and Koji Hayashi, both of Kuwana, all of Japan, assignors to Mitsubishi Kasei Vinyl Company and Mitsubishi Kasei Corporation, both of Tokyo, Japan

Continuation of Ser. No. 236,751, Aug. 26, 1988, abandoned. This application Oct. 9, 1990, Ser. No. 593,563
Claims priority, application Japan, Aug. 27, 1987, 62-213747; Oct. 8, 1987, 62-253958; Mar. 17, 1988, 63-64405
Int. Cl.[5] B29C *67/20*
U.S. Cl. 264—22 **17 Claims**

1. A process for producing a porous film having a tear strength (MD) of not less than 10 kg.cm/cm^2, a permeability of not less than 1000 g/m^2.24 hrs and a thickness from 0.01 to 0.5 mm, which comprises the steps of:

melt-molding a composition containing 100 parts by weight of a polyolefin resin, 25 to 400 parts by weight of a filler having an average particle size of 30 μm or less and 1 to 30 parts by weight of an ester of dipentaerythritol having a ratio of residual OH groups of 3 to 70% to obtain a sheet, and

stretching the sheet at 40° to 170° C. in at least one direction by 1.1 to 3.0 times.

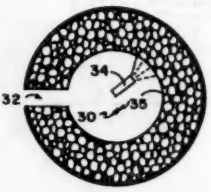
5,073,317
LARGE SPHERE PRODUCTION METHOD AND PRODUCT

Gregory R. Brotz, P. O. Box 1322, Sheboygan, Wis. 53081

Continuation-in-part of Ser. No. 947,389, Dec. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 620,688, Jun. 14, 1984, abandoned. This application Jul. 24, 1989, Ser. No. 384,550

Int. Cl.[5] B29D *22/00*; B29C *67/20*; B64G *1/10*

U.S. Cl. 264—29.1 4 Claims



1. A method of creating large hollow spheres comprising the steps of:

mixing a blowing agent with molten resin material;

suspending said mixture in a cool zero gravity environment;

activating said blowing agent;

foaming said mixture into a spherical cellular structure having cell walls by action of the blowing agent with the molten resin material;

expanding the volume of said molten resin material by said foaming;

cooling the outside surface of said sphere in the cool environment;

solidifying said outside surface of said sphere by said cooling;

breaking said foam's inner cell walls by action of a heat gun melting said resin material;

forming a hollow center in said sphere by the breaking of said foam's inner cell walls by flowing said melted inner cellular wall material outward toward the solid outside surface of said sphere;

cooling said remaining molten resin material;

forming an inner sphere wall having a solid surface concentrically within said solid outside surface by action of said cooling of said remaining resin molten material;

carbonizing said sphere by baking said sphere at high temperatures;

forming an aperture in said sphere;

carrying more molten resin and blowing agent material into said sphere;

projecting a globule of said molten resin material mixed with a blowing agent from inside said sphere to its outer surface through said aperture;

foaming said mixture into a spherical cellular structure having cell walls by action of said blowing agent with said molten resin material;

expanding the volume of said molten resin material by said foaming;

forming an adjoining partial sphere against said already-formed sphere from said foamed material;

cooling the outer surface of said adjoining sphere;

solidifying said outer surface of said adjoining sphere by said cooling;

breaking and melting said foam's inner cell walls by action of a heat gun;

tunneling into said adjoining sphere;

flowing said melted inner cellular wall material outward toward said adjoining sphere's outside surface by directing a heat gun thereagainst; and

regulating said heat applied to said inside wall of said sphere to be of a temperature that will not melt through said solid outside surface of said adjoining sphere.

5,073,318
VEHICLE INNER PANEL

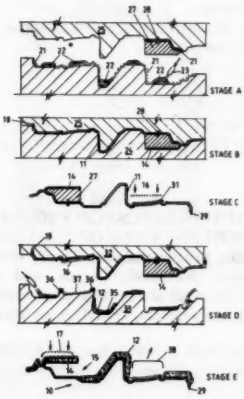
Milo L. Rohrlach, North Brighton, and William J. Hall, Eden Hills, both of Australia, assignors to Bridgestone Australia Ltd., Edwardstown, Australia

Filed Sep. 27, 1989, Ser. No. 413,286

Claims priority, application Australia, Sep. 27, 1988, PJ0617; Nov. 24, 1988, PJ1606

Int. Cl.[5] B29C *67/22*

U.S. Cl. 264—46.5 9 Claims



1. A method of manufacture of a motor vehicle inner panel comprising the following steps:

(a) locating reinforcing fibers on one die part of a first two-part die set, applying moldable plastics material on that die part,

(b) closing the die set and retaining it closed during a molding process of the plastics material,

(c) opening the die set, and removing a molded substrate comprising the plastics material reinforced by the fibers,

(d) spraying a flexible color film layer into a first die part of a second two-part die set and applying a second layer of elastomer over the first layer, curing the color film and elastomer layers to form a dense, soft facing layer of the panel, positioning the molded substrate into a second die part of the second die set, applying moldable foam-forming plastics material over at least part of the facing layer between the facing layer and the substrate layer, closing the second die set and retaining closed during a foaming and molding process of the facing layer, and

(e) removing the panel from the second two-part die set, and trimming superfluous material from the panel.

5,073,319
PREPARATION OF THERMOPLASTIC COMPOSITIONS FILLED WITH CERAMIC POWDERS AND OXIDIC SINTER ADDITIVES

Hans-Josef Sterzel, Dannstadt-Schauernheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 11, 1990, Ser. No. 580,858

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1989, 3931654

Int. Cl.[5] B29C *47/00, 47/76*

U.S. Cl. 264—101 6 Claims

1. A process for preparing a thermoplastic composition filled with a ceramic powder and an oxidic sinter additive, which comprises melting the thermoplastic in a first zone of a mixing section consisting of a plurality of successive zones, admixing the molten plastic in an adjoining second zone with a suspension of a ceramic powder in an organic solvent which contains

a hyrolyzable precursor compound of the oxidic sinter additive in solution, adding to the mixture in a third zone an amount of water required for hydrolyzing the precursor compound, removing the solvent and any volatile hydrolysis products under reduced pressure in a fourth zone, and compressing and extruding the melt containing the ceramic powder from a fifth zone.

5,073,320

PREPARATION OF THERMOPLASTICS CONTAINING CERAMIC POWDERS AS FILLERS

Hans-Josef Sterzel, Dannstadt-Schauernheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 11, 1990, Ser. No. 580,860

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1989, 3931652

Int. Cl.[5] B29C *47/00, 47/76*

U.S. Cl. 264—101 **5 Claims**

1. A process for the preparation of a thermoplastic material containing ceramic powders as fillers, by mixing these ceramic powders with molten thermoplastic in a mixing zone having a plurality of successive zones which process comprises: melting the thermoplastic in a first zone, adding a suspension of the ceramic powder in an organic solvent to the molten thermoplastic in a second zone and mixing the components, removing the solvent under reduced pressure in a third zone, and compressing and extruding the melt containing the ceramic powder in a fourth zone.

5,073,321

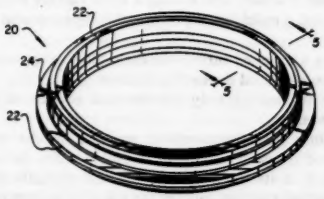
METHOD OF MAKING POLYMER SEALS

John H. Wheeler, Dallas, Tex., assignor to Texacone Company, Mesquite, Tex.

Division of Ser. No. 148,389, Jan. 25, 1988, Pat. No. 4,857,389. This application May 2, 1989, Ser. No. 346,528

Int. Cl.[5] B29C *39/12*

U.S. Cl. 264—102 **7 Claims**



4. A method of making a multi-layered polymer seal of varying hardness comprising the following steps: (1) a combination of pre-polymers for forming a urethane polymer are degased; (2) a polyester-based pre-polymer for forming a urethane polymer is mixed with a curing agent, heated to a predetermined temperature of between about 175° F. and 180° F., and poured into a preheated mold; (3) a predetermined time interval is allowed to elapse to allow sufficient curing of the polyester-based pre-polymer to form a bond and not a mixture with a pre-polymer to be subsequently added; (4) a polyether-based pre-polymer for forming a urethane polymer is mixed with a curing agent, heated to a predetermined temperature of about 150° F., and poured onto the surface of the polyester-based prepolymer mixture; (5) a second predetermined time interval is allowed to elapse to allow sufficient curing of the polyether-based pre-polymer to form a bond and not a mixture with a pre-polymer to be subsequently added; (6) a polyester-based pre-polymer is mixed with a curing agent, heated to a pre-determined temperature of between about 175° F. and 180° F., and poured onto the surface of the polyether-based pre-polymer mixture; and (7) the preheated mold is placed into a press for a predetermined length of time to final cure the seal.

5,073,322

PROCESSING OF ETHYLENE TEREPHTHALATE/HEXAHYDROTEREPHTHALATE COPOLYMER FILAMENTS

Steven M. Hansen, Kinston, N.C., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 29, 1990, Ser. No. 575,107

Int. Cl.[5] D01F *6/84*

U.S. Cl. 264—103 **3 Claims**

1. Process for preparing a tow of crimped filaments of ethylene terephthalate/hexahydroterephthalate copolymer of 80–86 mol percent terephthalic acid/20–14 mol percent hexahydroterephthalic acid components, said filaments having high load-bearing capacity, including the steps of melt-spinning said copolymer into filaments, forming a tow from a multiplicity of said filaments, and subjecting said tow to 2 stages of drawing, followed by annealing, and then crimping, wherein the annealing step is carried out using rolls heated to a temperature of 140°–175° C.

5,073,323

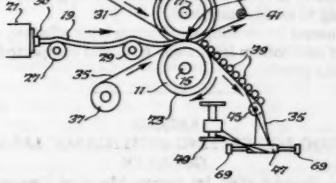
METHOD AND APPARATUS FOR PRODUCING COMPACTED PARTICULATE ARTICLES

Henry A. McCartney, Winterhaven, Fla., assignor to Washington Mills Ceramics Corporation, North Grafton, Mass.

Filed May 30, 1990, Ser. No. 530,631

Int. Cl.[5] B29B *9/06*

U.S. Cl. 264—118 **19 Claims**



1. Apparatus for producing compacted particulate articles comprising:

a) means for extruding mixtures of particulate materials and binders;

b) means for introducing said mixtures in their extruded form to a briquetting press;

c) at least one briquetting press comprising;

(1) a pair of compaction wheels rotatable in opposite directions, one to the other;

(2) a plurality of die pockets formed in mating surfaces of said compaction wheels, said die pocket being numbered and arranged to correspond as said compaction wheels are rotated, said die pockets being formed from a resilient polymer material; and

(3) means to rotate said compaction wheels;

d) means for introducing a top layer of polymer film onto said mixtures in their extruded form;

e) means for introducing a bottom layer of polymer film onto said mixtures in their extruded form, said top layer, said mixtures in their extruded form and said bottom layer, in that order, forming a sandwich;

f) means for introducing said sandwich to said corresponding die pockets as said compaction wheels are rotated to produce compacted particulate articles with both a top and bottom layer of acutely deformed polymer film thereon;

g) means for diverting said top layer upwardly, under longitudinal tension, away from said compacted particulate articles as said acute deformation of said top layer tends to return it to its original state thus producing discrete sur-

face movement in respect to any portion of the surface of said top layer still in contact with one or more of said compacted particulate articles, the combination of said discrete surface movement and gravity, resulting from said upward drawing of said top layer, effecting a decrease in the adherence of said one or more of said compacted particulate articles still in contact with said surface of said top layer;

h) means for peeling said top layer away from said one or more of said compacted particulate articles still in contact with said surface of said top layer;

i) means for diverting said bottom layer downwardly, under longitudinal tension, as said acute deformation of said top layer tends to return to its original state thus producing discrete surface movement in respect to any portion of the surface of said bottom layer to which one or more of said compacted particulate articles adhere to, said discrete surface movement effecting a decrease in the adherence of said one or more of said compacted particulate articles;

j) means for imposing longitudinal tension on both said top layer and said bottom layer producing discrete surface movement in respect to portions of the surfaces of both said top layer and said bottom layer in contact with said compacted particulate articles, effecting a decrease in the adherence thereof to said portions of said surfaces of both said top layer and said bottom layer;

k) means for peeling said bottom layer away from said contact with said compacted particulate articles, said means for peeling which comprises;

(1) means for draping said bottom layer so as to peel the edges thereof away from said compacted particulate articles;

(2) means for substantially further diverting said bottom layer to a direction which is substantially vertical; said further diverting in combination with gravity contributing to said peeling; and

(3) means for twisting said bottom layer effecting a peeling of said bottom layer away from said compacted particulate article.

5,073,324

METHOD FOR SETTING OPHTHALMIC LENSES IN GOGGLES

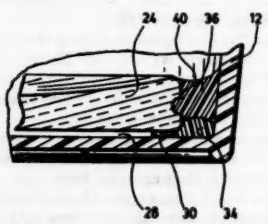
Manon J. Beaudet, 6664, 1st Avenue, Montreal, Quebec, Canada H1Y 3B1

Filed Feb. 25, 1991, Ser. No. 659,630

Claims priority, application United Kingdom, Mar. 8, 1990, 9005230

Int. Cl.[5] B29C *39/12;* **B29D** *11/00*

U.S. Cl. 264—255 **8 Claims**



1. A method for setting an ophthalmic lens in a pair of preassembled goggles having a flat front transparent lamina for permitting vision and a conical shielding rim surrounding said lamina and extending toward the face of a wearer for a abutment thereon, said method comprises,

laying an ophthalmic lens having a curved and a flat plane, the flat plane of the lens being positioned adjacent said lamina and separated by a thin flat air gap for preventing the lent from touching the lamina, the lens having a peripheral wall substantially perpendicular to the flat plane of the lens and slightly smaller than the rim to maintain a substantially uniform peripheral interface between the periphery of the lens and the rim,

depositing in said interface a first silicone-base caulking to cover the periphery of said gap, said first caulking having a viscosity sufficiently high to be sag-proof for maintaining said caulking at the periphery of said gap during its hardening period,

depositing in said interface, over said first caulking, a second silicone-base caulking to cover at least a part of said peripheral wall, said second caulking having a viscosity lower than the first caulking, and

allowing said second caulking to dry during a predetermined period of time.

5,073,325

METHOD FOR PRODUCING A MOLDED ARTICLE HAVING STABILIZED DECORATIVE FEATURES

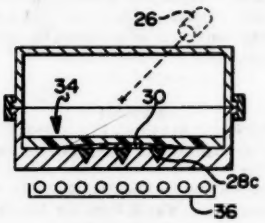
John D. Gray, Union, N.H., assignor to Davidson Textron Inc., Dover, N.H.

Filed Jul. 18, 1989, Ser. No. 381,377

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.[5] B28B *1/32;* **B29C** *39/12, 41/08*

U.S. Cl. 264—245 **6 Claims**



1. In a process for forming a decorative feature in situ in a base layer of a plastic shell made from thermoplastic material cast against a heated tool having a mold surface and having a mold up and a mold down position the improvement comprising:

forming a recessed surface on the mold surface corresponding to a desired decorative feature;

selectively heating only the recessed surface of the mold surface;

depositing first thermoplastic material in the selectively heated recessed surface of the mold when the mold surface is in its mold up position and partially fusing the deposited material only in the selectively heated recessed surface to form an exposed upper surface;

protectively coating and stabilizing the location of the first thermoplastic material within the recessed surface by spraying only the exposed upper surface of the partially fused material in the recessed surface and surface segments of the mold surface located adjacent the recessed surface with plastisol material to form a coating across the exposed upper surface of the partially fused material so as to prevent migration of the partially fused material from the recessed surface;

heating the mold surface of the tool including the recessed surface and the surface segments of the mold surface located adjacent the recessed surface to heat the coating and the partially fused material in the recessed surface;

fusing a base layer of second thermoplastic material across the full surface of the mold and bonding it to the coating and the partially fused material in the recessed surface while fully fusing the material in the recessed surface; and

cooling and stripping the base layer of second thermoplastic material and the fully fused material in the recessed surface from the mold surface so as to form a shell with a decorative feature.

5,073,326

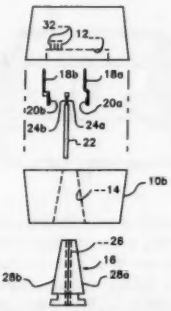
APPARATUS AND METHOD FOR INJECTION MOLDING ARTICLES WITH SUB-SURFACE PORTIONS

Roderick M. Craves, Oxford; Franklyn J. Korany, Detroit, and Mark J. Jacobson, New Hudson, all of Mich., assignors to Prism Design & Engineering, Inc., Oxford, Mich.

Filed Aug. 9, 1989, Ser. No. 391,489

Int. Cl.[5] B29C *45/14, 39/10*

U.S. Cl. 264—278 **38 Claims**



1. A method for injection molding an article having a preform insert therein with a sub-surface portion comprising the steps of:

moving first and second die members of an injection mold reciprocally with respect to one another, said first and second die molds cooperatively defining an article cavity therebetween with at least one wedge-receiving aperture defined by a wall in one of said die members having at least one tapered sidewall extending from a surface defining said article cavity and an external surface of said die member;

operatively positioning at least one wedge member in said at least one wedge-receiving aperture formed in said injection mold for receiving at least one preform with a sub-surface portion;

sliding said at least one wedge member within said at least one wedge-receiving aperture and into engagement with said at least one tapered sidewall;

guiding said at least one wedge member during insertion into said die member and withdrawal from said die member with an elongated projection attached along a corner of said at least one wedge member cooperating with a corresponding recess in said die member;

locating said at least one sub-surface portion of said preform with a part extending externally of said article cavity held in at least one sub-surface part locating aperture defined by a surface on said at least one wedge member;

injection molding said article; and

releasing said at least one wedge member to free said sub-surface portion of said preform while ejecting said article from said cavity.

5,073,327

PROCESS FOR PRODUCING MONO- OR BIAXIALLY DRAWN POLYKETONE FILMS

George B. Klingensmith, Virginia Beach, Va., and Randolph N. Campbell, Katy, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 411,771, Sep. 25, 1989, and a continuation-in-part of Ser. No. 411,772, Sep. 25, 1989. This application Jan. 11, 1991, Ser. No. 639,858

Int. Cl.[5] B29C *55/08, 55/12*

U.S. Cl. 264—290.2 **13 Claims**

6. A process for producing a non-porous biaxially drawn polyketone film comprising a linear alternating terpolymer of carbon monoxide, ethylene and a second ethylenically unsaturated hydrocarbon of at least 3 carbon atoms, having a melting point of at least 214° C., comprising the steps of drawing a sheet of said film along two axes, at a draw ratio of from 4 to 20, at a draw temperature of from 4° to 15° C. below the melting point of the terpolymer.

5,073,328

INJECTION MOLDING PROCESS

Robert D. Schad, Toronto, Canada, and Paul Brown, Sunny Isle, Virgin Islands, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada

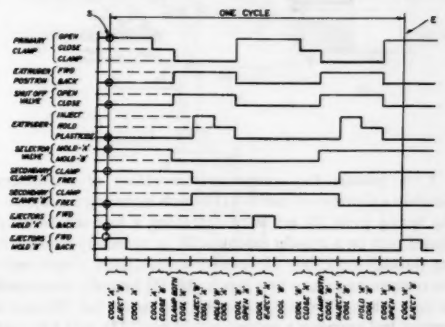
assignors to Husky Injection Molding Systems Ltd., Bolton, Canada

Continuation-in-part of Ser. No. 150,157, Jan. 29, 1988, Pat. No. 4,867,938. This application Aug. 24, 1989, Ser. No. 398,256

The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.

Int. Cl.[5] B29C *45/10*

U.S. Cl. 264—297.2 **8 Claims**



1. A process for molding plastic parts utilizing an injection molding machine operating at primary and secondary injection pressures and including primary and secondary clamping means for clamping at least one first mold located at a first molding station and at least one second mold located at a second molding station, said molds comprising cooperating mold halves supported by fixed and movable platens, said platens being arranged in tandem, comprising the steps of:

providing molten plastic distributor means in a movable platen operable to communicate selectively with one of said first and second molds;

closing and clamping said molds by at least the primary clamping means;

injecting molten plastic at said primary injection pressure through said distributor means into said first clamped mold to fill said first clamped mold;

injecting molten plastic at said secondary injection pressure through said distributor means into said first clamped mold for sufficient interval after filling to compensate for shrinkage;

cooling the molten plastic in the first clamped mold;

injecting molten plastic at said primary injection pressure through said distributor means into said second clamped mold to fill said second clamped mold;

injecting molten plastic at said secondary injection pressure through said distributor means into said second clamped mold for sufficient interval after filling to compensate for shrinkage;

holding said second mold clamped using said secondary clamping means and cooling the molten plastic in the second mold;

unclamping the primary clamping means, opening the first mold and removing a molded plastic part, wherein said secondary clamping means holds the second mold closed while the first mold is open maintaining secondary injection pressure in the second mold while the first mold is open; and

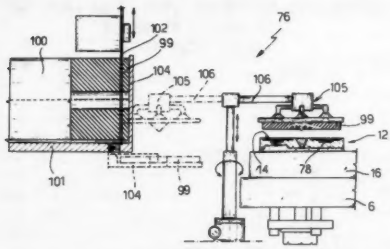
wherein said closing and opening steps include moving the movable platen with the distributor means therein.

5,073,329

METHOD FOR COMPRESSIONS MOULDING OF ELASTOMERS

Mauro Carrara, Viggiu', Italy, assignor to RFT S.p.A., Turin, Italy

Filed Oct. 19, 1990, Ser. No. 599,723
Claims priority, application Italy, Dec. 19, 1989, 68124 A/89
Int. Cl.[5] B28B *5/00*
U.S. Cl. 264—297.5 9 Claims



1. A process for compression moulding of elastomers wherein a plurality of carriers (**10**) each including a cooperating spring press (**8**) are advanced along a first substantially closed path on a transfer machine (**2**) for cyclically recirculating through a plurality of working stations, each of said carriers comprising at least two leaves (**16**, **18**) hingedly connected to each other, a first leaf carrying a first mould half (**12**) and a second leaf carrying a second mould half (**13**), said first and second halves being provided with cooperating recesses (**14**) adapted to form a mould cavity when said first and second halves are closed against each other, said process comprising the steps of:

a) advancing said spring presses (**8**) of said carriers along a second substantially closed path generally parallel to said first path for said carriers and substantially at same speed, each of said presses (**8**) comprising a jaw means (**26**) and a cooperating spring means (**27**);

b) opening selectively each of said carriers by causing one of said leaves (**16**, **18**) to rotate relative to the other so as to separate the respective mould halves;

c) maintaining said carriers in the open position;

d) depositing in a first mould half (**12**) of each carrier opened in step (b) a blank (**99**) of raw elastomeric mixture;

e) closing said carriers with corresponding blanks therein by causing one of said leaves (**16**, **18**) to rotate towards the other;

f) lifting selectively said jaw means (**26**) of each of said spring presses (**8**) for placing under said lifted jaw means a corresponding closed carrier;

g) displacing the carriers (**10**) placed under the corresponding jaw means in a first direction generally transverse to said first path;

h) clamping the carriers (**10**) displaced in step (g) under a corresponding spring press (**8**);

i) applying to said halves of each of said clamped carrier a predetermined moulding pressure by the spring means (**28**) of the corresponding spring press (**8**);

j) feeding said spring presses (**8**) and said carriers (**10**) clamped under corresponding presses into a polymerisation tunnel (**62**) wherein said closed mould halves are heated to a temperature greater than the ambient temperature; and

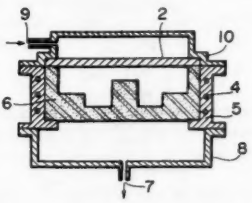
k) removing said carriers (**10**) from under said spring presses (**8**) by displacing said carriers (**10**) transversely to said first path in a second direction opposite to said first direction.

5,073,330

METHOD OF MOLDING POLYSILAZANE

Hiroaki Nishio; Keiji Watanabe, and Michitaka Sato, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Jul. 31, 1990, Ser. No. 560,679
Claims priority, application Japan, Jul. 31, 1989, 1-196937; Jul. 31, 1989, 1-196938
Int. Cl.[5] B29C *39/02, 49/00*
U.S. Cl. 264—535 18 Claims



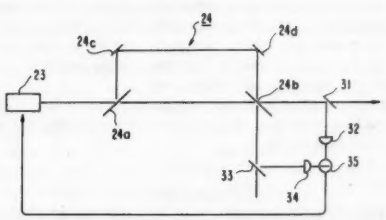
1. A method of molding polysilazane which comprises heating a liquid comprising a liquid polysilazane alone or containing not more than 30 wt. % of a ceramic powder or a ceramic precursor to form a highly viscous sheet having a viscosity coefficient of 10^4 to 10^6 poise, fitting the highly viscous sheet to a forming mold, and heating through the forming mold to set the sheet at a temperature of 100° to 300°.

5,073,331

MODULATION METHOD FOR USE IN A SEMICONDUCTOR LASER AND AN APPARATUS THEREFOR

Masataka Shirasaki, Setagaya, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

PCT No. PCT/JP89/00220, § 371 Date Apr. 13, 1989, § 102(e) Date Apr. 13, 1989, PCT Pub. No. WO89/08356, PCT Pub. Date Sep. 8, 1989
PCT Filed Mar. 2, 1989, Ser. No. 340,010
Claims priority, application Japan, Mar. 4, 1988, 63-049803; Jul. 27, 1988, 63-185399; Aug. 24, 1988, 63-208163
Int. Cl.[5] H01S *3/10*
U.S. Cl. 372—26 18 Claims



1. A semiconductor laser apparatus for driving a semiconductor laser, comprising:

modulating current generating means for phase modulating an output light of the semiconductor laser by generating a modulating current pulse such that an integral of an oscillation frequency becomes π or $-\pi$ in terms of a phase amount, said modulating current generating means includes means for determining the product of a chirping coefficient and a time integral of the modulating current pulse for a time slot; and

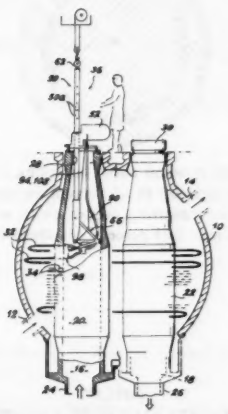
superimposing means for superimposing the modulating current pulse on a bias current.

5,073,332

DEVICE TO POSITION A DEVICE IN A CYLINDRICAL CAVITY COMPRISING PERFORATION DISPOSED ALONG A REGULAR NETWORK

Jean-Pierre Wanhem, St. Genevieve des Bois, and Benoît Guillo, Paris, both of France, assignors to Intercontrole S.A., Rungis Cedex, France

Filed May 1, 1990, Ser. No. 516,257
Claims priority, application France, May 16, 1989, 89 06369
Int. Cl.[5] G21C *17/00*
U.S. Cl. 376—249 14 Claims



1. Device to selectively position a member in a cylindrical cavity, said cylindrical cavity being defined within an inner cylindrical wall, and having a given longitudinal axis and providing an access opening at one of its extremities, said inner cylindrical wall providing perforations disposed along a network which radially open into said cavity, said perforations being generally directed towards said longitudinal axis of said cavity, this device including a seating provided to be secured to said opening and supporting a pole by means of positioning means, said positioning means enabling the pole to be moved in rotation and in translation between various pre-established indexing positions, the pole being orientated parallel to the axis of the cavity and supporting inside the latter a support block and an active head connected to the support block by means of an extensible cladding arm provided with extension means which, when implemented, have the effect of simultaneously cladding the support block and the active head against the inner cylindrical wall of the cavity, the active head being equipped with retractable fingers adapted to be introduced into the perforations, means for controlling a movement of the active head in a given working zone of said wall, this zone being different for each of the pole indexing positions, and at least one support suitable for receiving said member to be positioned.

5,073,333

DECONTAMINATION METHOD

Jan Arvesen, Nykoping, Sweden, assignor to Studsvik AB, Nykoping, Sweden

PCT No. PCT/SE89/00399, § 371 Date Oct. 24, 1989, § 102(e) Date Oct. 24, 1989, PCT Pub. No. WO90/01774, PCT Pub. Date Feb. 22, 1990
PCT Filed Jul. 7, 1989, Ser. No. 424,238
Claims priority, application Sweden, Aug. 11, 1988, 8802872-5
Int. Cl.[5] G21C *19/42*
U.S. Cl. 376—310 33 Claims

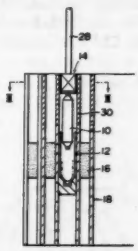
1. A method of decontaminating radio nuclide-contaminated corrosion products, which are insoluble or sparingly soluble in acids, from primary systems surfaces in nuclear reactors of the pressurized water type, the boiler reactor type with hydrogen dosage and similar, especially for the decontamination for the purpose of demolishing or scrapping such reactors or components thereof, where the contaminated surfaces are contacted with an oxidation agent in an acid solution so as to obtain an oxidation in the presence of Ce^{4+} ions, ozone and chromic acid, and the corrosion products which have been made acid soluble by means of said oxidation are dissolved, characterized by performing said oxidation with Ce^{4+} ions, ozone and chromic acid with concentrations thereof required for said decontamination, in the presence of perhalogen acid at a pH below 3.

5,073,334

SELF-ACTUATED NUCLEAR REACTOR SHUTDOWN SYSTEM

Makoto Saito, and Minoru Gunji, both of Mito, Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Mar. 14, 1990, Ser. No. 493,151
Claims priority, application Japan, Mar. 17, 1989, 1-65072
Int. Cl.[5] G21C *7/12*
U.S. Cl. 376—336 3 Claims



1. In a nuclear system having a core of a plurality of wrapper tubes, and a fuel assembly disposed within each of the tubes, a self-actuated nuclear shutdown system comprising:

a control rod guide tube surrounded by the wrapper tubes of the core of the nuclear system with a space defined directly above the guide tube being surrounded by upper ends of the wrapper tubes,

a control rod disposed coaxially with said control rod guide tube;

an electromagnet disposed above said control rod in the nuclear system;

drive shaft means connected to said electromagnet for moving said electromagnet axially of said control rod guide tube over a predetermined distance;

temperature-sensitive magnetic material forming the upper end of each of the wrapper tubes,

the temperature-sensitive magnetic material of the wrapper tubes disposed entirely above the level at which the upper end of said control rod guide tube is located in the nuclear system, said upper ends of the wrapper tubes formed of the temperature-sensitive magnetic material each having an axial length equal to said predetermined distance over which said drive shaft means moves said electromagnet, and the temperature-sensitive magnetic material having a characteristic by which the saturation magnetic flux density thereof is reduced when the temperature thereof is raised above its Curie-point;

said temperature-sensitive material and said electromagnet operable to establish a magnetic circuit which latches said control rod to said electromagnet, when the electromagnet is positioned in said space surrounded by the upper ends of the wrapper tubes and the temperature thereof is below its Curie-point,

the magnetic circuit being broken when coolant flowing in the nuclear system through the wrapper tubes reaches a temperature sufficient to raise the temperature of the temperature-sensitive magnetic material above its Curie-point, whereupon said control rod will become unlatched

from said electromagnet so as to drop into said control rod guide tube.

5,073,335

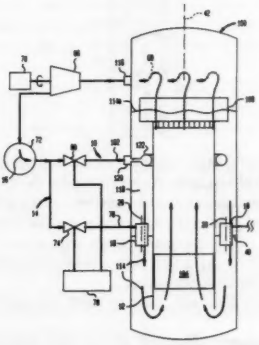
BWR TURBOPUMP RECIRCULATION SYSTEM

Harold E. Townsend, Campbell, Calif., assignor to General Electric Company, San Jose, Calif.

Continuation-in-part of Ser. No. 553,073, Jul. 10, 1990. This application Feb. 25, 1991, Ser. No. 660,306

Int. Cl.[5] G21C *15/24*

U.S. Cl. 376—373 **11 Claims**



1. A recirculation system for driving reactor coolant water in an annular downcomer defined between a boiling water nuclear reactor vessel and a core shroud spaced radially inwardly therefrom comprising:

means for supplying feedwater to said vessel; and

a turbopump disposed inside said downcomer and including:

a stationary axle;

a plurality of inlet guide vanes fixedly joined to an upstream end of said axle for receiving said coolant water from said downcomer;

a pump impeller rotatably joined to said axle and having an inlet end for receiving said coolant water, and an outlet end for discharging said coolant water at an increased pressure;

a plurality of outlet guide vanes fixedly joined to a downstream end of said axle for channeling said discharged coolant water back into said downcomer;

an annular plenum surrounding said impeller and joined to said feedwater supplying means for receiving said feedwater;

a plurality of circumferentially spaced turbine blades fixedly joined to said impeller and disposed in flow communication with said plenum for receiving said feedwater for rotating said impeller for driving said coolant water; and

means for lubricating said impeller solely by said feedwater upon rotation of said impeller about said axle.

5,073,336

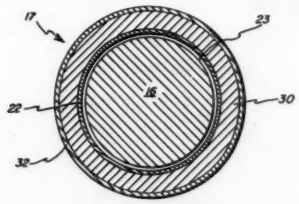
CORROSION RESISTANT ZIRCONIUM ALLOYS CONTAINING COPPER, NICKEL AND IRON

Dale F. Taylor, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 356,474, May 25, 1989, Pat. No. 4,986,957. This application Oct. 1, 1990, Ser. No. 590,747

Int. Cl.[5] G21C *3/06*

U.S. Cl. 376—457 **6 Claims**



1. A corrosion resistant alloy, consisting essentially of by weight percent about 0.5 to 2.0 percent tin, about 0.24 to 0.40 percent of a solute comprising copper, nickel and iron, wherein the copper is at least 0.05 percent, and the balance zirconium.

5,073,337

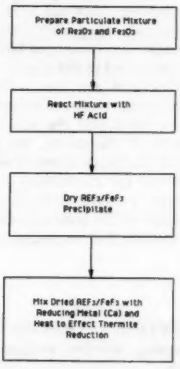
RARE EARTH/IRON FLUORIDE AND METHODS FOR MAKING AND USING SAME

Frederick A. Schmidt, Ames; John T. Wheelock, Neveda, and David T. Peterson, Ames, all of Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jul. 17, 1990, Ser. No. 554,189

Int. Cl.[5] C22C *33/00*

U.S. Cl. 420—83 **22 Claims**


Prepare Particulate Mixture of Re2O3 and Fe2O3
React Mixture with HF Acid
Dry REF3/FeF3 Precipitate
Mix Dried REF3/FeF3 with Reducing Metal (Ca) and Heat to Effect Thermite Reduction

1. A method of making a fluoride compound, comprising the steps of:

a) preparing a particulate mixture of Fe_2O_3 and RE_2O_3 where RE is a rare earth element, and

b) reacting the particulate mixture with HF acid in an amount exceeding the stoichiometric amount needed to hydrofluorinate the Fe_2O_3 and RE_2O_3, the excess amount of said HF acid being effective to yield an insoluble fluoride compound comprising REF_3 and FeF_3 present in solid solution in the REF_3 crystal lattice.

5,073,338

HIGH STRENGTH STEEL BOLTS

Sadayoshi Furusawa; Toyofumi Hasegawa, both of Kobe; Takeshi Nakahara, Akashi, and Takehiko Kato, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 28, 1990, Ser. No. 590,137
Int. Cl.[5] C22C 38/28
U.S. Cl. 420—109 2 Claims

1. High strength bolts formed of steels containing as alloy elements:

$0.30\% \leqq C \leqq 0.50\%$,

$Si < 0.10\%$,

$0.50\% \leqq Mn \leqq 0.70\%$,

$P \leqq 0.01\%$,

$S \leqq 0.01\%$,

$0.30\% \leqq Cr \leqq 1.05\%$,

$0.50\% \leqq Mo \leqq 1.05\%$,

$0.01\% \leqq Al \leqq 0.05\%$,

$0.0020\% \leqq Ti < 0.050\%$, and

$0.002\% \leqq N \leqq 0.010\%$,

said elements Si, Mn, P, S, Mo, Al, Ti and N satisfying the relation as follows

$0.05\% \leqq Mo - 45P - 11S \leqq 0.85\%$,

$7.5Si + 1.7Mn \leqq 1.85\%$ and

$0.020\% \leqq 10Ti + Al - 6N \leqq 0.50\%$;

and the balance of Fe and inevitable impurities.

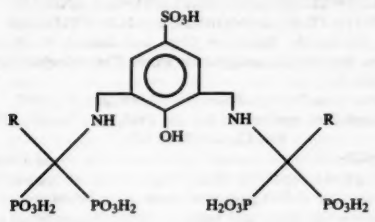
5,073,339

METHOD OF INHIBITING CORROSION AND SCALE FORMATION IN AQUEOUS SYSTEMS

Robert P. Kreh, Jessup, Md., assignor to W. R. Grace & Co. - Conn, Columbia, Md.

Filed Aug. 23, 1990, Ser. No. 571,063
Int. Cl.[5] C23F 11/12
U.S. Cl. 422—15 18 Claims

1. A method of inhibiting scale and corrosion formation from metal surfaces in contact with aqueous solutions comprising introducing into said aqueous solution a polyamino-polyphosphono-hydroxybenzenesulfonic acid agent selected from compounds of the formula:



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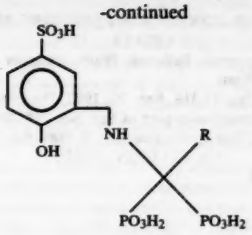


II

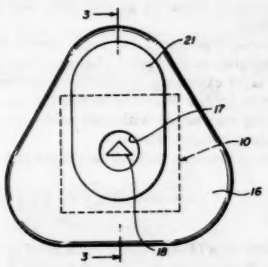
wherein R represents hydrogen, methyl or ethyl, mixtures of said compounds and their alkali metal or alkaline earth metal salts, and maintaining said agent in said aqueous solution in concentrations of from about 0.1 to 50,000 ppm.

5,073,340

DEPOSITING A BINDER ON A SOLID SUPPORT

Gloria J. Covington, Arnold, and Timothy G. Bloomster, Reistertown, both of Md., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 106,075, Oct. 8, 1987, abandoned. This application Jul. 6, 1990, Ser. No. 549,670
Int. Cl.[5] G01N 31/22
U.S. Cl. 422—56 13 Claims



1. A test device for use in detecting the presence of an analyte, comprising:

a casing having an aperture;

a solid support comprising an upper surface and contained in said casing;

a test area on the upper surface of said support and positioned in registry with said aperture;

a binder for said analyte attached to said test area;

a detectable chromogen marker attached to said binder, related to the presence or absence of the binder which does not interfere with said assay; and

a background area on the upper surface of said support without binder and detectable marker;

wherein:

said marker causes the binder to be distinguishable from said support so that, before the device is used in said assay the device is examined to confirm that binder is present in said test area.

7. A process for producing a test device suitable for detecting the presence of an analyte, comprising:

providing a solid support comprising an upper surface;

contacting said upper surface with a binder for said analyte;

contacting said binder with a detectable marker related to the presence or absence of the binder which does not interfere with said assay;

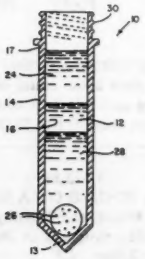
detecting the marker to confirm that binder is present in said device; and

placing the support in a casing including an aperture with the test area in registry with the aperture.

5,073,341
DEVICES FOR CONDUCTING SPECIFIC BINDING ASSAYS

William R. Hargreaves, Bellevue, Wash., assignor to Biotope, Inc., Seattle, Wash.

Division of Ser. No. 17,318, Feb. 20, 1987, Pat. No. 4,868,130, which is a continuation-in-part of Ser. No. 768,108, Aug. 21, 1985, abandoned. This application Aug. 9, 1989, Ser. No. 391,796
Int. Cl.[5] G01N *21/01*
U.S. Cl. 422—58 14 Claims



1. An assay vessel for separating bound label from unbound label within an assay mixture, wherein said assay mixture includes one or more binding components, label bound to at least some of said binding components, and a substantially aqueous solution containing unbound label, said binding components differing in apparent density from said aqueous solution, comprising:

a vessel having a proximal end and a closed distal end, said vessel defining an elongated chamber therein;

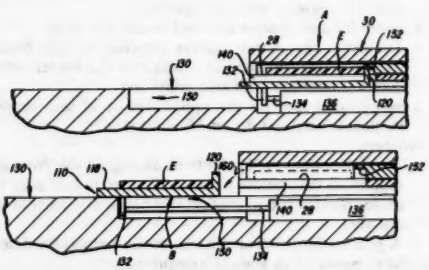
a primary layer extending generally transversely within the chamber to form a selective barrier therein, said primary layer being immiscible with both said unbound label and said binding components; and

a barrier layer between said primary layer and said proximal end.

5,073,342
RECIPROCATING TRANSFER MECHANISM

Johannes J. Porte, Webster, and Raymond F. Jakubowicz, Rush, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,712
Int. Cl.[5] G01N *35/00*
U.S. Cl. 422—64 10 Claims



1. A transfer mechanism for moving a test element from a first location in a clinical analyzer to a second location in a clinical analyzer disposed at a different level than said first location, comprising

a first support surface defining the first location,

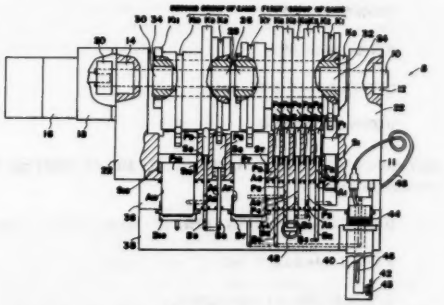
a pusher blade positioned under said first support surface and having a leading portion, a rear portion, and a flat support surface thereon extending the entire distance between said leading portion and said rear portion, for receiving and supporting a test element in the second location, said pusher blade further including an upwardly extending finger portion integrally formed with and extending from said rear portion, said first support surface having a slot formed therein to accommodate said finger portion, and

moving means for moving said blade from the first location in which it is directly under said first support surface to the second location at which said blade is no longer under said first support surface so that the first and second locations are at different vertical levels.

5,073,343
APPARATUS FOR MEASURING A LIQUID SPECIMEN

Takahito Hukuhara, and Teiichi Yabuta, both of Hyogoken, Japan, assignors to TOA Medical Electronics Co. Ltd., Hyogoku, Japan

Filed Oct. 19, 1989, Ser. No. 424,194
Claims priority, application Japan, Oct. 20, 1988, 63-264603
Int. Cl.[5] G01N *35/08, 1/14*
U.S. Cl. 422—67 11 Claims



1. A control system for controlling an analyzer of a liquid speciment comprising:

a plurality of cams;

means for rotating said plurality of cams;

a plurality of pistons mounted for moving in a plurality of cavities;

means for resiliently urging said plurality of pistons into contact with respective ones of said plurality of cams;

at least a first of said plurality of pistons including means for displacing a fixed quantity of said liquid specimen;

at least some of a remainder of said pistons including means for forming valves controlling a flow of said liquid displaced by said first of said plurality of pistons;

said means for rotating including at least one one-way clutch; and

said at least one one-way clutch being effective for rotating at least some, but less than all, of said plurality of cams when said means for rotating rotates in one direction.

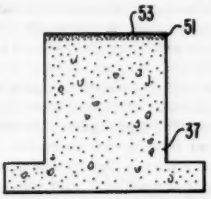
5,073,344
DIAGNOSTIC SYSTEM EMPLOYING A UNITARY SUBSTRATE TO IMMOBILIZE MICROSPHERES

Michael W. Smith, Peachtree City, and Robert S. Pierce, Smyrna, both of Ga., assignors to Porex Technologies Corp., Fairburn, Ga.

Continuation-in-part of Ser. No. 74,968, Jul. 17, 1987, abandoned. This application Jul. 21, 1988, Ser. No. 222,812
Int. Cl.[5] G01N *31/22*
U.S. Cl. 422—69 15 Claims

1. A diagnostic apparatus comprising a one piece open celled porous substrate defining a top surface and a lower reservoir section and a top layer, said top layer being microporous and biochemically inert, said reservoir portion being macroporous and being in capillary communication with the micropores of

said top surface, wherein said micropores are of a size sufficient to trap, in or on the top layer, microspheres of a diameter of 5 microns or less, the pores in said reservoir portion having an



average size of at least 20 microns in diameter, said reservoir portion having a substantially greater volume than said top layer.

5,073,345

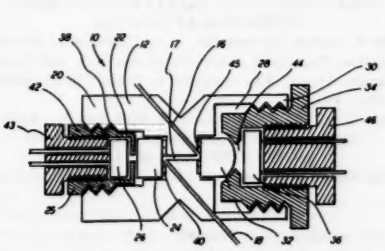
LIGHT DETECTOR APPARATUS

Raymond P. W. Scott, Wilton, and Gary J. Schmidt, New Fairfield, both of Conn., assignors to The Perkin Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 499,702, May 31, 1983. This application Jul. 9, 1985, Ser. No. 753,370

Int. Cl.[5] **G01N** *21/01, 30/02*

U.S. Cl. 422—70 **4 Claims**



1. A dedicated cation detector arrangement for the direct detection of cations, said arrangement comprising:

means for supplying eluted cation effluent for detection of metal cations therein;

a reaction vessel; said vessel being in fluid flow communication with said means for supplying eluted cation effluent;

means for supplying a reagent to said reaction vessel of the type adapted to react therein with said effluent to form a reactant with meal cations having maximum light absorption at approximately a preselected wavelength for direct detection of absorptivity and quantification of metal constituents; and

a dedicated light absorption detector assembly for the direct detection of said reactant of cations having a total length of about 23 millimeters; said assembly including a unitary housing having a central axis; said housing having an outside diameter on the order of about 17 millimeters and an opening through the center portion thereof of the order of about 0.74 millimeters; an elongated tubular sample flow cell mounted along said axis substantially in the middle of said housing; said flow cell defining a volume of about 1.7 microliters, said flow cell having an inlet tube directly at one end thereof, which is connected to said reaction vessel for receiving said reactant therefrom, said inlet tube having an inside diameter of about 0.25 millimeters, said inlet tube being disposed at an acute angle with respect to said axis, said flow cell having an outlet tube directly at the other end thereof, which is disposed substantially parallel to said inlet tube; said outlet tube having an inside diameter of about 0.5 millimeters; a first window mounted on said axis in said housing and sealingly connected to one extremity of said flow cell; a light emitting diode integrally mounted in said housing on said axis and being disposed adjacent said first window, said diode having a peak wavelength output of approximately said preselected wavelength of maximum light absorption of said reactant of cations; a second window mounted on said axis in said housing and sealingly connected to the other extremity of said flow cell, said inlet tube being aligned to inlet into said flow cell directly against said second window, a photosensitive detector means for directly detecting absorptivity of metal cation reactant in said flow cell to determine quantification of the respective metal, said detector means being mounted on said axis integrally in said housing and being disposed adjacent said second window; said second window having a convex surface facing said photosensitive detector to disperse a light beam passing through the flow cell onto the total sensitive area of the photosensitive detector.

5,073,346

COMBINED INCUBATOR AND CUVETTE HOLDING APPARATUS

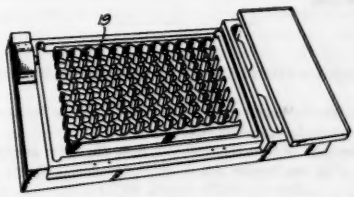
Paul Partanen; Helena Seppanen, both of Helsinki, Finland, and Hannu Harjunmaa, Vessy, Switzerland, assignors to Labsystems OY, Helsinki, Finland

Division of Ser. No. 53,859, May 13, 1987, abandoned, and Ser. No. 111, Oct. 7, 1986, abandoned. This application Jul. 13, 1989, Ser. No. 379,493

Claims priority, application Finland, Oct. 7, 1985, 853895

Int. Cl.[5] **B01L** *7/02, 9/06*

U.S. Cl. 422—99 **2 Claims**



1. The combination of an incubator and cuvette set which comprises:

a rectangularly shaped thermostated incubator having a plurality of uniformly spaced heating pins (19) through which heat is conducted integral with and extending upwardly therefrom, and

a cuvette set (17) having a plurality of cuvettes (18) of cylindrical shape interconnected at their upper portions by means of a support plate so as to from a rectangular matrix to maintain the cuvettes uniformly spaced one from the other in accordance with the uniformly spaced heating pins (19) of the incubator,

each of said heating pins (19) having a quadrangular shape with its sidewalls concaved to conform substantially to the cylindrical shape of the cuvettes,

said rectangular cuvette set (17) being adapted t be fitted to said incubator,

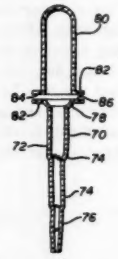
whereby said cylindrical cuvettes (18) are caused to self-locate between the concaved sidewalls of said pins (19) and provide a gap between the cylindrical walls of said cuvettes 18 and the concaved sidewalls of said pins (19), thereby allowing air to circulate freely during controlled thermostatic heating of said cuvettes (18) via said heating pins (19).

5,073,347

UNITARY VOLUMETRIC PIPETTE AND METHOD FOR MAKING THE SAME

Ralph F. Garren, Chatsworth, and Ara Martirosian, Woodland Hills, both of Calif., assignors to Beral Enterprises, Inc., Chatsworth, Calif.

Filed Jul. 17, 1990, Ser. No. 554,300
Int. Cl.[5] B01L *3/02*
U.S. Cl. 422—100 **15 Claims**



12. A volumetric pipette for dispensing fluid comprising:

a separately formed injected molded stem having a wall which forms an elongated tubular portion that defines a fluid receiving chamber formed from a solid core member, said elongated tubular portion having one end having an opening for said fluid receiving chamber and a second end that translates into and forms a first bulbous portion; and

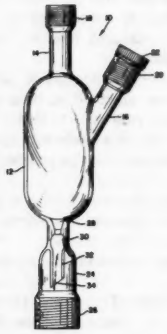
a second bulbous portion bonded to said first bulbous portion to cooperatively define a hollow deformable bulb which is in communication with said fluid receiving chamber and is adapted to provide vacuum or air pressure to said fluid receiving chamber, said first bulbous portion being bonded to said second bulbous portion to form a leak proof joint between said first and second bulbous portions.

5,073,348

LIQUID ADDITION FUNNEL FOR PRESSURE REACTORS

Charles M. DeWoody, Vineland, N.J., assignor to Ace Glass Incorporated, Vineland, N.J.

Continuation of Ser. No. 160,152, Feb. 25, 1988, abandoned.
This application Jul. 9, 1990, Ser. No. 549,666
Int. Cl.[5] B01L *11/00*; B65D *47/18*
U.S. Cl. 422—101 **8 Claims**



1. A pressure equalizing liquid addition funnel for a closed system reaction vessel comprising:

a hollow funnel having an upper inlet port and a lower outlet port at the bottom thereof and a first outlet neck surrounding said outlet port and extending downwardly, said first neck adapted to be mounted on said reaction vessel with said outlet port in communication with the interior thereof, and a second neck surrounding said inlet port and disposed in the upper portion of said vessel, said first and second necks having a common longitudinal axis;

valve seat means disposed in said outlet port;

valve stem means extending axially from said second neck, through said funnel, through said seat means, and into said first neck, for engaging and disengaging said seat means to open and close said outlet, said stem means further comprising a rod having a passageway therein extending from the lower end of said rod upwardly, said passageway terminating at a port in the sidewall of said rod adjacent and below said second neck, said passageway defining a lumen extending from the interior of said first neck upwardly to the upper portion of said funnel adjacent said second neck whereby when said funnel is mounted on a reaction vessel inlet the pressure in said funnel will be equalized with that within said vessel by said passageway in said rod providing communication between said reaction vessel and said upper portion of said funnel;

valve control means mounted on said second neck and connected to said stem means for controlling the opening and closing of said outlet;

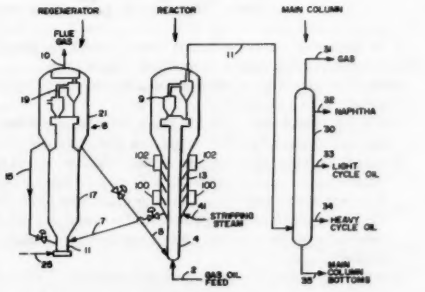
closure means at the inlet port for opening and closing said port.

5,073,349

HIGH EFFICIENCY CATALYTIC CRACKING STRIPPING APPARATUS

Joseph A. Herbst, Turnersville, N.J.; Catherine L. Markham, Thornton, Pa.; Ajit V. Sapre, W. Berlin, N.J., and Gerald J. Teitman, Vienna, Va., assignors to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 454,472, Dec. 21, 1989, Pat. No. 4,968,403.
This application Aug. 9, 1990, Ser. No. 565,005
Int. Cl.[5] F27B *15/14*; B01J *8/24*
U.S. Cl. 422—144 **9 Claims**



1. A catalytic cracking apparatus comprising

a cracking reactor means having an inlet for a source of hot regenerated cracking catalyst, an inlet for a source of a heavy hydrocarbonaceous feed, and an outlet for cracked products and spent catalyst comprising strippable hydrocarbons;

a spent catalyst and cracked product separation means connective with said reactor outlet and adapted to separate cracked products from spent catalyst comprising strippable hydrocarbons;

a spent catalyst stripping means having an inlet for spent catalyst connective with said cracked products and spent catalyst outlet of said reactor, an inlet for a stripping gas, an outlet for stripped catalyst having a reduced content of strippable hydrocarbons, and outlet for stripping gas and hydrocarbons stripped from said cracking catalyst by said stripping means;

a catalyst regeneration means adapted to produce hot regenerated catalyst by regeneration of spent catalyst with combustion gas having an inlet for stripped catalyst connective with said stripped catalyst outlet of said stripping means, an inlet for regeneration gas, an outlet for flue gas, and an outlet for resulting hot regenerated catalyst which is connective with said cracking reactor means; characterized in that

said spent catalyst stripping means comprises a means for generating microwave radiation and a means for distributing said microwave radiation into said stripper.

5,073,350

HEAT EXCHANGER FOR HEATING THE CHARGE OF A CATALYTIC REFORMING UNIT OPERATING UNDER LOW PRESSURE

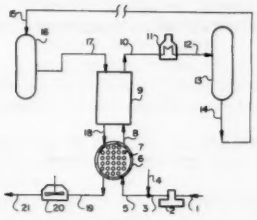
Pierre Ham, La Celle St Cloud, and Jean de Bonneville, Rueil-Malmaison, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Division of Ser. No. 365,259, Oct. 12, 1989, Pat. No. 4,973,400. This application Aug. 27, 1990, Ser. No. 572,584

Claims priority, application France, Oct. 13, 1988, 88 13627

Int. Cl.[5] B01J *4/00*

U.S. Cl. 422—190 **5 Claims**



1. An apparatus for catalytic hydrocarbon reforming comprising:

at least two catalytic reforming reactors in series,

means for introducing a vaporized mixture of gas, recycled from a catalytic reforming reactor of said series, and vaporized hydrocarbon charge to a first of said catalytic reforming reactors,

means for removing effluent from said first catalytic reforming reactor and delivering said effluent to the next catalytic reformer reactor in the series,

means for mixing a liquid hydrocarbon charge and said gas recycled from a catalytic reforming reactor of said series to form a gas/liquid mixture,

means for delivering said gas/liquid mixture to a first indirect heat exchanger wherein said liquid hydrocarbon charge is vaporized to form said vaporized mixture,

means for removing said vaporized mixture from said first indirect heat exchanger and delivering said vaporized mixture to a second indirect heat exchanger,

means for removing said vaporized mixture from said second indirect heat exchanger and delivering said vaporized mixture to said means for introducing a vaporized mixture of said first catalytic reformer reactor,

means for removing a final reactor effluent from the last catalytic reforming reactor in said series and delivering said final reactor effluent to said second indirect heat exchanger wherein said final reactor effluent undergoes heat exchange with said vaporized mixture,

means for removing said final reactor effluent from said second indirect heat exchanger and delivering said final reactor effluent to said first indirect heat exchanger wherein said final reactor effluent undergoes further heat exchange with said gas/liquid mixture

means for removing said final reactor effluent from said first indirect heat exchanger and

wherein the ratio of exchange surface area in said first indirect heat exchanger to exchange surface area in said second indirect heat exchanger is 1:10–5:10.

5,073,351

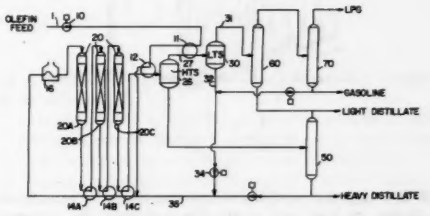
PRODUCTION OF MIDDLE DISTILLATE RANGE HYDROCARBONS BY LIGHT OLEFIN UPGRADING

James H. Beech, Jr., Wilmington, Del.; Hartley Owen, Belle Mead, N.J.; Michael P. Ramage, Morrestown, N.J., and Samuel A. Tabak, Wenonah, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 935,374, Nov. 26, 1986, Pat. No. 4,849,186, which is a continuation-in-part of Ser. No. 699,882, Feb. 8, 1985, Pat. No. 4,720,600, which is a continuation-in-part of Ser. No. 654,348, Sep. 25, 1984, Pat. No. 4,547,612, and a continuation-in-part of Ser. No. 616,376, Jun. 1, 1984, Pat. No. 4,504,691. This application Mar. 13, 1989, Ser. No. 322,263

Int. Cl.[5] B01J *8/04, 19/24*

U.S. Cl. 422—190 **6 Claims**



1. In a continuous system for upgrading lower olefin feedstock to higher hydrocarbons including means for combining olefinic feedstock with a pressurized liquid diluent stream comprising C_5^+ olefins, reactor means for contacting the diluted feedstock with a shape selective medium pore acid zeolite catalyst under reaction conditions at moderate temperature in a pressurized reactor system comprising a series of catalytic reactor beds to convert olefins and recover reactor effluent at reaction conditions; the improvement which comprises:

means for incrementally decreasing reactor temperature from a first reactor bed in the series to a last reactor bed to promote oligomerization in the last reactor bed; and

first separation means operatively connected to receiver effluent from said last reactor bed for separating reactor effluent in a primary phase separation zone to vaporize light and middle distillate hydrocarbon components into a first vapor phase stream and recover from the primary separation zone a heavy liquid hydrocarbon recycle stream, said heavy liquid stream containing at least 50% of those C_{16}^+ hydrocarbons recovered in the reactor effluent;

recycle means for passing the heavy liquid hydrocarbon recycle stream from said first separation means to said first reactor bed, maintained under conditions to degrade heavy hydrocarbons;

second separation means operatively connected to receive said first vapor phase stream for condensing a light portion of the first vapor phase and recovering a dominant portion of a light olefinic recycle stream as an intermediate liquid product stream for further reaction in a lower temperature serial reactor bed in said series of reactor beds to promote oligomerization, said light recycle stream comprising a major portion of C_6 to C_8 hydrocarbons recovered in the reactor effluent; and

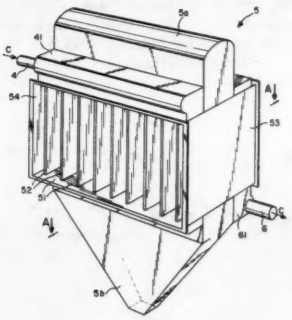
fractionation means for distilling the intermediate liquid product stream recovered from the second separation means to obtain a distillate product stream consisting essentially of substantially linear C_9–C_{16} aliphatic hydrocarbons.

5,073,352

APPARATUS FOR THE LOW PRESSURE REFORMING OF GASOLINES WITH HEATING BY SMOKE GASES

Quang Dang Vu, Neuilly; Jean-Paul Bournonville, Cergy Pontoise; Larry Mank, Orgeval, and Jean-Charles Viltard, Marly le Roi, all of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Division of Ser. No. 382,886, Jul. 21, 1989, Pat. No. 4,973,401.
This application Aug. 3, 1990, Ser. No. 562,532
Claims priority, application France, Jul. 22, 1988, 88 10039
Int. Cl.[5] B01J *8/02*
U.S. Cl. 422—213 8 Claims



8. In a reactor comprising at least one means for introducing a charge, at least one means for removing the processed charge, at least one means for introducing a powdery solid in the upper part of said reactor, at least one means for removing said solid from the lower part of said reactor, said reactor further comprising:

at least two elementary reaction cells spaced apart from each other and spaced apart from the walls of said reactor, substantially vertical and parallelepipedic and substantially parallel to each other, at least two of said elementary reaction cells next to each other defining a substantially parallelepipedic channel; and at least one of said walls together with an elementary cell closest to said wall and substantially parallel to said wall defining a substantially parallelepipedic channel; said channels being suitable for gas flow, each of said cells being formed of the three following substantially parallelepipedic enclosures:

an individual charge distributor,

an individual processed charge collector,

a space for a powdery solid bed between said individual distributor and said individual collector, said bed being open, over the whole of a substantially vertical first face of said individual distributor and open, over the whole of the first face of said individual collector, said first faces each being defined by a wall permeable to fluids and impermeable to solid particles.

5,073,353

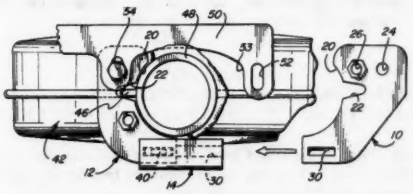
CATALYTIC CONVERTER FRONT FLANGE AND METHOD OF MAKING SAME

Roy S. Florian, Southington, Conn., assignor to Nickson Industries, Inc., Plainville, Conn.

Filed Nov. 14, 1989, Ser. No. 436,430
Int. Cl.[5] F16L *23/032*
U.S. Cl. 422—310 16 Claims

1. A replacement flange for the end of a catalytic converter of the type having outwardly extending flanges along its sides and an outlet pipe which is coupled to the flange of the associated vehicle exhaust system and which converter is mounted upon support structure of an associated vehicle, said flange comprising:

(a) a pair of coupling elements opposite each other having opposing edges, each element having a generally vertically extending leg portion and a generally horizontally extending base portion, the opposing edges of said coupling elements having an arcuate configuration to seat a portion of the periphery of the outlet pipe of an associated catalytic converter and aligned opposed recesses to seat the side flanges of the associated catalytic converter, said elements being spaced apart at the upper end of said leg portions, each of said coupling elements having a plurality



of bolt receiving apertures therein for mounting upon the support structure of the associated vehicle and for coupling to the flange of the associated exhaust system of the vehicle; and

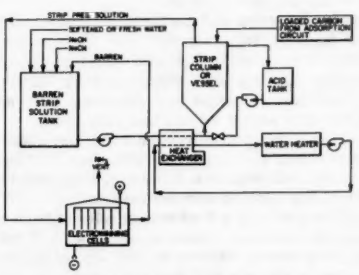
(b) a channel element for seating and joining the opposed ends of said base portions of said coupling elements, said channel element permitting horizontal sliding motion therein of one of said coupling elements relative to the other.

5,073,354

PROCESS OF STRIPPING GOLD AND SILVER FROM CARBON

Everett J. Fuller, Gillette, N.J.; Lionel B. Luttinger, Erwinna, Pa., and Mark G. Lang, Passaic, N.J., assignors to Drew Chemical Corporation, Boonton, N.J.

Filed Sep. 26, 1990, Ser. No. 588,247
Int. Cl.[5] C22B *3/42*
U.S. Cl. 423—24 11 Claims



1. A process for stripping a metal value selected from gold and silver from activated carbon on which said metal value is adsorbed as a metal cyanide complex which comprises: subjecting said metal cyanide complex-adsorbed carbon to an aqueous solution of a compound selected from (a) benzoic acid and substituted benzoic acids and (b) polyacrylic acids of less than about 100,000 molecular weight, the concentration of said compound being effective to strip adsorbed metal cyanide complex from said carbon.

5,073,355

PROCESS FOR THE REMOVAL OF CHLORINE FROM OFF-GASES

Achim Hartmann, Pulheim, Fed. Rep. of Germany, assignor to Kronos (U.S.A.), Inc., Hightstown, N.J.

Filed Jul. 5, 1990, Ser. No. 548,669

Claims priority, application European Pat. Off., Jul. 5, 1989, 89112241.8

Int. Cl.[5] C01B *7/01;* C01G *23/02*

U.S. Cl. 423—79 26 Claims

1. A process for the removal of chlorine from off-gases which continuously or sporadically contain chlorine comprising scrubbing the off-gases with a ferrous chloride-containing aqueous solution in a scrubbing system, said ferrous chloride-containing aqueous solution being obtained by dissolving a solids mixture resulting from chlorination of a titaniferous and ferriferous feedstock material and containing essentially ferrous chloride and by separating from the solution the undissolved components of the solids mixture and insoluble substances formed during the dissolution step.

5,073,356

INTEGRATED PROCESSES FOR THE PRODUCTION OF CARBON MONOXIDE

David E. Guro, Coopersburg; Ravi Kumar, Allentown; David M. Nicholas, New Tripoli, and Gary S. Roth, Trexlertown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 20, 1990, Ser. No. 586,359

Int. Cl.[5] C01B *31/02, 21/26, 3/24;* B01J *8/00*

U.S. Cl. 423—415 A 31 Claims

1. An integrated process for bulk separation and recovery of carbon monoxide and the separate separation and recovery of a hydrogen-rich gas from a gas mixture, additionally containing carbon dioxide, methane and nitrogen, from a reformation reaction of a hydrocarbon feed stream, comprising:

(a) reforming a hydrocarbon feed stream in a reformation reaction into a gas mixture containing at least hydrogen, carbon monoxide, carbon dioxide, methane and nitrogen;

(b) separately separating and recovering carbon monoxide and a hydrogen-rich gas from the gas mixture, wherein the carbon monoxide is separated from the gas mixture in a single stage and a purity of at least 98 volume percent by selective adsorption of the carbon monoxide on a copper containing adsorbent capable of adsorbing bulk quantities of the carbon monoxide from the gas mixture; and

(c) recycling at least a portion of the gas mixture as a portion of the feed stream to the reformation reaction after the separations of carbon monoxide and hydrogen-rich gas.

5,073,357

PROCESS FOR PRODUCING HYDROXYLAPATITES

Osamu Takagi, Seto; Kishiro Azuma, Tokai, and Tatsuichi Iwamura, Nagoya, all of Japan, assignors to Toagosei Chemical Industry, Co., Ltd., Tokyo, Japan

Filed Jul. 18, 1990, Ser. No. 554,709

Claims priority, application Japan, Aug. 1, 1989, 1-199807

Int. Cl.[5] C01B *15/16, 25/26*

U.S. Cl. 423—308 10 Claims

1. A process for producing hydroxylapatite which comprises reacting hexagonal prismatic or acicular monetite with at least one compound selected from the group consisting of potassium hydroxide and lithium hydroxide in an aqueous medium at a temperature of from 75° to 100° C.

5,073,358

PREPARATION OF SILICON NITRIDE POWDER

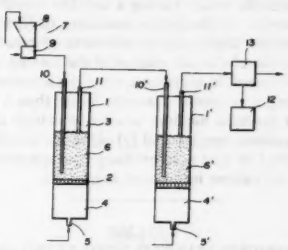
Mutsuo Shimizu; Hirofumi Fukuoka, both of Annaka, and Masanori Fukuhira, Takasaki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 24, 1990, Ser. No. 557,572

Claims priority, application Japan, Jul. 28, 1989, 1-195954; Jul. 28, 1989, 1-195955

Int. Cl.[5] C01B *21/068*

U.S. Cl. 423—344 7 Claims



1. A method for preparing silicon nitride powder, comprising the steps of:

1. preparing a feed material by granulating a silicon powder having a particle size of less than 44 μm to an average particle size of from 149 μm to 4 μm with a binder;
2. heating the granulated silicon powder t a temperature of from 1100° C. to 1300° C. to sinter the particles together but not to melt the particles;
3. continuously supplying the feed material to a first fluidized bed composed of silicon nitride powder and a non-oxidizing reaction gas containing nitrogen or ammonia gas while maintaining the bed at 1,000° to 1,400° C.;
4. effecting a first nitriding reaction in said first fluidized bed;
5. continuously withdrawing the nitride product from said first fluidized bed and supplying it to a second fluidized bed composed of silicon nitride powder and a non-oxidizing reaction gas containing nitrogen or ammonia gas, and
6. effecting a second nitriding reaction in said second fluidized bed for nitriding the unreacted feed material.

5,073,359

PROCESS FOR MANUFACTURING CERAMIC MAGNETIC MATERIAL

Nicola Sparvieri, and Paolo Cattarin, both of Rome, Italy, assignors to Selenia Industrie Elettroniche Associate S.p.A., Rome, Italy

Filed Mar. 1, 1990, Ser. No. 487,755

Claims priority, application Italy, Mar. 1, 1989, 47699 A/89

Int. Cl.[5] C01G *49/00*

U.S. Cl. 423—594 5 Claims

1. A method of producing ceramic magnetic material comprising:

dissolving metal oxides and metal carbonates in nitric acid;

adding citric acid thereto to yield metal organic precipitates;

neutralizing the remaining solution by the addition of ammonium hydroxide to result in a substantially neutral solution; and

heating the neutralized solution to a temperature of about 200° C. to cause self-combustion and to yield the ceramic magnetic material.

5,073,360

BRIDGE/LAMELLAR METALLIC OXIDES

Mostafa Kairy; Daniel Tinet, both of Orleans, and Henri Van Damme, Olivet, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 12, 1989, Ser. No. 366,180
Claims priority, application France, Jun. 10, 1988, 88 07748
Int. Cl.[5] C01F 1/00
U.S. Cl. 423—608 23 Claims

1. A process for the preparation of a metallic oxide having a bridged lamellar structure, comprising (a) intimately admixing a gel of a metallic oxide having a lamellar structure with at least one member of the group consisting of (i) a solution of inorganic cations displaying an e/r ratio of greater than 1.5 wherein e is the electronic charge of the cations and r is the ionic radius thereof, in angstroms, and (ii) a solution of organic cations having a molecular diameter larger than 6 Å, (b) adding to such reaction medium a solution which comprises a spheroidal cationic species, and (c) aging the reaction medium for such period of time as to exchange the spheroidal cationic species for the cations introduced in step (a).

5,073,361

COMPOUND MARKED WITH TRITIUM, ITS PREPARATION AND ITS USE IN THE LOCATION OF NUCLEAR RECEPTORS OF RETINOIDS

Braham Shroot, and Michel Darmon, both of Antibes, France, assignors to Centre International De Recherches Dermatologiques Galderma (CIRD Galderma), Valbonne, France

Filed Jul. 19, 1990, Ser. No. 553,812
Claims priority, application France, Jul. 20, 1989, 89 09778
Int. Cl.[5] A61K 49/02; C07C 63/34
U.S. Cl. 424—1.1 6 Claims

1. 6-[3-(1-adamantyl)-4-methoxyphenyl]-2-naphthoic acid marked with tritium.

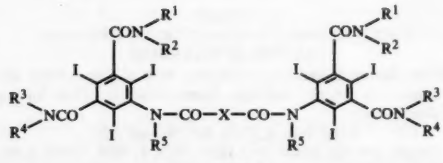
5,073,362

DICARBOXYLIC ACID-BIS(3,5-DICARBAMOYL-2,4,6-TRIIODOANILIDES) AND X-RAY CONTRAST MEDIA CONTAINING THEM

Peter Blaszkiewicz, and Ulrich Speck, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation of Ser. No. 245,242, Sep. 16, 1988, abandoned. This application Jul. 16, 1990, Ser. No. 554,948
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731542
Int. Cl.[5] A61K 49/04; C07C 237/46
U.S. Cl. 424—5 20 Claims

1. A dicarboxylic acid bis-(3,5-dicarbamoyl-2,4,6-triiodoanilide) of the formula



wherein the amide radicals —CONR[1]R[2] and —CONR[3]R[4] are different from one another and

R[1] is hydrogen, C[1-4]-alkyl or R[2], wherein R[1] and R[2] may be the same or different,

R[2] is monohydroxy- or polyhydroxy-C[2-8] alkyl,

R[3] is hydrogen, C[1-4]-alkyl or R[4], wherein R[3] and R[4] may be the same or different,

R[4] is monohydroxy- or polyhydroxy-C[2-8]-alkyl,

R[5] is hydrogen, C[1-4]-alkyl or monohydroxy- or polyhydroxy-C[1-4]-alkyl, and

X is C[1-6]-alkylene, optionally substituted by 1 to 6 hydroxy, C[1-7]-alkoxy, benzyloxy, hydroxybenzyloxy or hydroxy-C[1-7]-alkoxy groups and/or interrupted by 1–3 oxygen atoms.

5,073,363

FOAMABLE FLUORIDE GELS AND METHOD

Michael A. Pellico, 3024 Military Ave., Los Angeles, Calif. 90272

Continuation-in-part of Ser. No. 418,251, Oct. 6, 1989. This application Jan. 16, 1990, Ser. No. 465,374
Int. Cl.[5] A61K 7/16, 7/18
U.S. Cl. 424—49 20 Claims

1. An acidified and foamable fluoride gel composition comprising:

an acid stable and orally compatible, water miscible, gelling agent in an amount to impart stable gel characteristics to the gel composition;

an acid stable and orally compatible, water miscible, foaming agent in an amount to provide a stable foam upon oral application of the gel composition;

an orally compatible acidifying agent in an amount to provide the gel composition with a pH between about 3.0 and about 4.5;

a water soluble dental fluoride in an amount to provide the gel composition with about 0.5 to about 5.0 wt.% available fluoride; and

water to 100 wt.%.

5,073,364

PRESSED POWDER COSMETIC PRODUCT

Corinna C. Giezendanner, Wyckoff; Ann Krog, Red Bank, both of N.J.; Nancy Valdes, Baldwin, N.Y., and Joseph DiSomma, Ramsey, N.J., assignors to Revlon, Inc., New York, N.Y.

Filed Jun. 19, 1990, Ser. No. 540,087
Int. Cl.[5] A61K 7/02, 7/035
U.S. Cl. 424—63 19 Claims

1. A pressed powder cosmetic product comprising at least one cream pressed powder composition and at least one frost pressed powder composition, each of which comprise at least one filler, a portion of which is coated with a surfactant; at least one colorant a portion of which is coated with a surfactant, and a powder binder comprising at least 2% of a first component selected from the group consisting of polyethylene, boron nitride, polymethacrylate, and mixtures thereof, and at least 1% of a second component selected from the group consisting of zinc stearate, calcium stearate, lithium stearate, magnesium stearate, lauroyl lysine, calcium silicate, or mixtures thereof wherein said powder binder is present in a concentration of between about 0.5% and about 15% by weight of the cream pressed powder and about 3% and about 15% of the frost pressed powder; and an oil binder comprising esters and silicones; and wherein said frost pressed powder composition comprises a pearlescent powder; whereby said powder compositions are disposed adjacent to each other in a single pan thereby forming a unitary solid.

5,073,365

CLINICAL AND PERSONAL CARE ARTICLES ENHANCED BY LUBRICANTS AND ADJUVANTS

Martin Katz, Menlo Park; Helen C. Leong, Atherton, and Chung-Heng Cheng, San Jose, all of Calif., assignors to Advanced Polymer Systems, Redwood City, Calif.

Filed Jun. 1, 1989, Ser. No. 359,546
Int. Cl.[5] A61F 13/28; A61K 9/14; A61M 25/00
U.S. Cl. 424—489 18 Claims

1. A method of applying a liquid substance to the surface of an article to be used in contact with tissue, comprising dusting said surface with solid particles substantially spherical in shape with an average diameter of from about one micron to about 100 microns and containing a substantially continuous network of pores open to the exterior of said particles, with said liquid substance residing in said pores.

5,073,366

ANALGESIC COMPOSITION USEFUL IN PROVIDING A TEMPORARY RELIEF FROM SYMPTOMS OF ARTHRITIS

Fred Beck, P.O. Box 693, 999 Old Town Rd., Coram, N.Y. 11727

Filed May 30, 1989, Ser. No. 358,856
Int. Cl.[5] A61K *31/78, 47/00*
U.S. Cl. 424—720 **4 Claims**

1. A composition useful in providing temporary relief from symptoms of arthritis, comprising:

Water (Deionized)	86.00–95.35% by weight;
Carbopol 934 (cross-linked acrylic acid polymer)	0.5–2.00% by weight;
Methylparaben	0.1–0.40% by weight;
Propylparaben	0.05–0.20% by weight;
Hampene 100 (tetrasodium EDTA)	0.05–0.20% by weight;
Aloe Vera Gel	0.50–2.00% by weight;
Benzyl Alcohol	0.30–1.20% by weight;
Camphor (U.S.P.)	0.50–2.00% by weight;
[Methol] Menthol (U.S.P.)	1.00–4.00% by weight;
Thymol	0.10–0.60% by weight;
Eugenol	0.10–0.60% by weight;
Witch Hazel	0.05–1.50% by weight;
Isopropyl Alcohol	0.05–1.50% by weight;
[Euclayptus] Eucalyptus Oil	0.50–2.00% by weight;
Triethanolamine	0.50–2.00% by weight; and,
Quaternium-15 (N-(3-chloroallyl)hexaminium chloride)	0.10–0.40% by weight.

5,073,367

METHOD FOR INCREASING THE PRODUCTIVITY OF SOWS

Tan H. Nguyen, Le Porlair, France, assignor to Guyomarc'h Nutrition Animale, Elven, France

Filed May 4, 1989, Ser. No. 347,409
Claims priority, application France, May 9, 1988, 88 06215
Int. Cl.[5] A61K *39/07*
U.S. Cl. 424—93 **3 Claims**

1. A method for increasing the productivity of clinically healthy sows, wherein Bacillus IP 5832 and/or its spores is/are administered orally to breeding sows.

5,073,368

SANGUINARIA MOUTHRINSE HAVING IMPROVED ANTI MICROBIAL ACTIVITY AND STABILITY

Malathy Subramanian, Somerset, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.

Filed May 15, 1991, Ser. No. 699,878
Int. Cl.[5] A61K *7/16, 7/26*
U.S. Cl. 424—58 **9 Claims**

1. A mouthrinse composition comprising about 0.01 to about 0.2% by weight of a benzophenanthridine alkaloid in an aqueous solution and a surfactant combination of an amido betaine and a block polymer of polyoxyethylene and polyoxypropylene, the surfactant combination being present in the composition at a concentration of about 0.1 to about 3.0% by weight, the weight ratio of betaine to polymer being in the range of about 1:10 to about 1:2.

5,073,369

EFOMYCINS AS PERFORMANCE PROMOTERS IN ANIMALS

Klaus Frobel; Erwin Bischoff, both of Wuppertal; Hartwig Müller, Velbert; Olga Salcher, Wuppertal; Anno De Jong, Wuppertal; Friedrich Berschauer, Wuppertal, and Martin Scheer, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 17, 1986, Ser. No. 840,638
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1985, 3511753
Int. Cl.[5] A61K *35/00, 31/70;* **A63L** *1/00*
U.S. Cl. 424—121 **20 Claims**

1. At least one member selected from the group consisting of efomycin A, B, C, D and F.

5,073,370

LOW CALORIE, HIGH FIBER LAXATIVE

E. Harvey Meer, Cresskill; Frank Mountain, Ridgewood, and Herbert V. Schultz, Jersey City, all of N.J., assignors to Meer Corporation, North Bergen, N.J.

Continuation of Ser. No. 275,714, Nov. 23, 1988, Pat. No. 4,996,051. This application Feb. 22, 1991, Ser. No. 660,406
The portion of the term of this patent subsequent to Feb. 26, 2008, has been disclaimed.
Int. Cl.[5] A61K *35/78*
U.S. Cl. 424—195.1 **4 Claims**

1. In a natural fiber laxative containing psyllium husk, sweetener, gum arabic and flavorants, the improvement comprising:

apple fiber,

said apple fiber and said psyllium husk constituting together at least 75% by weight of said composition,

said psyllium husk being between 40% to 58% by weight of said composition, and

said apple fiber being between 23% and 40% by weight of said composition.

5,073,371

LEAVE-ON FACIAL EMULSION COMPOSITIONS

Deborah J. Turner, Naugatuck; Arvind M. Mehta, Woodbridge; Jeanne M. Foley, West Haven, and Darrell G. Doughty, Shelton, all of Conn., assignors to Richardson-Vicks, Inc., Shelton, Conn.

Filed Nov. 30, 1990, Ser. No. 621,166
The portion of the term of this patent subsequent to Dec. 17, 2008, has been disclaimed.
Int. Cl.[5] A61K *7/00, 31/78*
U.S. Cl. 424—401 **20 Claims**

1. A leave-on facial emulsion composition, substantially free from fats and oils and anionic surfactants, comprising:

(a) from about 0.01% to about 5% of a cationic surfactant;

(b) from about 0.01% to about 5% of one or more of a carboxylic acid copolymer;

(c) from about 1% to about 10% of a humectant; and

(d) a cosmetically acceptable carrier;

wherein said composition provides a contact angle between sebum and skin from 0° to about 10°, and a spreading index for sebum migration greater than about 8300 pixels over the time period from 0–5 minutes.

5,073,372

LEAVE-ON FACIAL EMULSION COMPOSITIONS

Deborah J. Turner, Naugatuck; Arvind M. Mehta, Woodbridge; Jeanne M. Foley, West Haven, and Darrell G. Doughty, Shelton, all of Conn., assignors to Richardson-Vicks, Inc., Shelton, Conn.

Filed Nov. 30, 1990, Ser. No. 621,167

The portion of the term of this patent subsequent to Dec. 17, 2008, has been disclaimed.

Int. Cl.[5] A61K *7/00, 31/78*

U.S. Cl. 424—401 20 Claims

1. A leave-on facial emulsion composition, substantially free from fats and oils and anionic surfactants, comprising:

(a) from about 0.01 to about 5% of a cationic surfactant;

(b) from about 0.1 to about 10% of a non-volatile organopolysiloxane having an average molecular weight of at least 200,000;

(c) from about 0.01 to about 5% of one or more of a carboxylic acid copolymer;

(d) from about 1% to about 10% of a humectant; and

(e) a cosmetically acceptable carrier; wherein said composition provides a contact angle between sebum and skin from 0° to about 10°, and a spreading index for sebum migration greater than about 8300 pixels over the time period from 0–5 minutes.

5,073,373

FLOWABLE DEMINERALIZED BONE POWDER COMPOSITION AND ITS USE IN BONE REPAIR

Robert K. O'Leary, Spring Lake, N.J., and Patrick A. McBrayer, Yardley, Pa., assignors to Osteotech, Inc., Shrewsbury, N.J.

Filed Sep. 21, 1989, Ser. No. 410,596

Int. Cl.[5] A61K *35/32*

U.S. Cl. 424—422 14 Claims

1. A flowable composition for application to a bone defect site to promote new bone growth at the site which comprises a new bone growth-inducing amount of pulverized demineralized osteogenic bone powder in a biocompatible carrier for the bone powder wherein said carrier is selected from the group consisting of glycerol, monoacetin, diacetin and mixtures thereof.

5,073,374

FAST DISSOLVING BUCCAL TABLET

John A. McCarty, Biscayne Park, Fla., assignor to Schering Corporation, Kenilworth, N.J.

Filed Nov. 30, 1988, Ser. No. 278,099

Int. Cl.[5] A61K *9/20, 47/00*

U.S. Cl. 424—435 10 Claims

1. A buccal tablet comprising an effective amount of a buccally absorbable active ingredient, a water soluble buccal tablet excipient selected from the group consisting of sucrose, lactose and sorbitol present in an amount ranging from 90 to 99 percent of the tablet weight, and a pharmaceutically acceptable lubricant wherein the lubricant is magnesium stearate or sodium dodecyl sulfate in an amount ranging from 1 to 3 percent of the tablet weight and wherein the lubricant is chosen so that disintegration occurs from 0.5 to 5 minutes after administration.

5,073,375

PHARMACEUTICAL PREPARATION FOR PERCUTANEOUS ADMINISTRATION CONTAINING EPERISONE OR TOLPERISONE OR SALT THEREOF

Mitsuhiro Yoshida, Fukaya; Yutaka Morita, Honjou; Yoshio Ishino, Kumagaya, and Shigemitsu Ohsawa, Honjou, all of Japan, assignors to Sansho Co., Ltd. and Eisai Co., Ltd., both of Tokyo, Japan

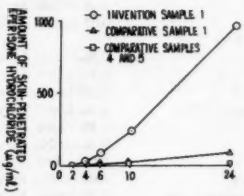
Division of Ser. No. 193,713, May 13, 1988. This application Aug. 2, 1990, Ser. No. 561,707

Claims priority, application Japan, May 15, 1987, 62-118660; Mar. 16, 1988, 63-62944

The portion of the term of this patent subsequent to Oct. 22, 2008, has been disclaimed.

Int. Cl.[5] A61K *9/70, 31/445, 31/40, 31/19*

U.S. Cl. 424—449 13 Claims



1. A pharmaceutical preparation for percutaneous administration which comprises (a) eperisone, a salt thereof, tolperisone or a salt thereof and (b) a monoglyceride of an aliphatic acid having 8 to 12 carbon atoms and an ester of lactic acid with an aliphatic alcohol having 12 to 18 carbon atoms or a monoglyceride of an aliphatic acid having 8 to 12 carbon atoms.

5,073,376

PREPARATIONS CONTAINING L-CARNITINE

Willibald E. Kohl, Muri bei Bern, and Thomas Scholl, Visp, both of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Mar. 27, 1990, Ser. No. 499,629

Claims priority, application Switzerland, Dec. 22, 1989, 4633/89

Int. Cl.[5] A61K *9/48*

U.S. Cl. 424—451 10 Claims

1. A preparation for enteral application comprising at least one tablet composed of the salt of L-carnitine with L-tartaric acid in the molar ratio of 2:1, powder composed of the salt of L-carnitine with L-tartaric acid in the molar ratio of 2:1 or at least one capsule containing the salt of L-carnitine with L-tartaric acid in the molar ratio of 2:1.

5,073,377

METHOD OF PREPARING ORAL DOSAGE FORMS WITH A GRANULATING COMPOSITION

Thomas A. Alexander, South Bend; Lawrence J. Daher, Elkhart, both of Ind.; Clarence L. Hancock, Edwardsburg, Mich., and Donald L. Peterson, Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.

Division of Ser. No. 266,649, Nov. 3, 1988, Pat. No. 4,965,072. This application Oct. 4, 1990, Ser. No. 592,613

Int. Cl.[5] A61K *9/26, 9/46*

U.S. Cl. 424—458 2 Claims

1. A method of preparing a rapidly disintegrating swallowable tablet, comprising the steps of:

a. mixing an ingredient selected from the group consisting of calcium carbonate, magnesium hydroxide, acetaminophen, sodium bicarbonate or citric acid with a granulating composition composed of an aqueous solution of magnesium sulfate heptahydrate and sodium hexametaphosphate in a ratio of about 4 to 1 by weight with a solid content of

40 to 50% by weight until a uniformly wetted mixture is produced;

b. drying the wetted mixture between about 40 and about 100 degrees Centigrade;

c. sizing the dried mixture to produce a free flowing granulation; and

d. tabletting the granulation to produce a rapidly disintegrating swallowable tablet.

5,073,378

PROCESSES FOR THE PREPARATION OF STORAGE STABLE COLLAGEN PRODUCTS

Shmuel Shoshan, Motza Elite, Israel; Dov Michaeli, San Francisco, Calif., and Shlomo Magdassi, Jerusalem, Israel, assignors to Yissum Research Development Company of the Hebrew University of Jerusalem, Jerusalem, Israel

Filed Dec. 20, 1988, Ser. No. 286,998

Claims priority, application Israel, Dec. 22, 1987, 84911

Int. Cl.[5] A61K *37/12, 35/32*

U.S. Cl. 424—548 **3 Claims**

1. The process for preparing a storage stable lyophilized collagen product comprising acid soluble purified native collagen and platelet derived growth factors comprising:

a) combining acid soluble collagen with platelet rich plasma;

b) incubation said mixture at a temperature of about 34° to 37.5° C. for a period of about 30 to 60 minutes until the formation of a solid gel;

c) cooling said gel at a temperature of about 0° to 4° C. for a period of about 60 to 120 minutes, whereupon said gel undergoes dissolution;

d) centrifuging the resulting solution at 15,000-35,000 RPM for 15-25 min. to remove insoluble collagen, platelet membranes and cell debris whereby there is obtained a supernatant containing soluble collagen and Platelet release products, and

e) lyophilizing said solution to form a stable lyophilized product.

5,073,379

CONTINUOUS PREPARATION OF SOLID PHARMACEUTICAL FORMS

Roger Klimesch, Alsbach-Haehnlein; Gerhard Bleckmann, Lampertheim; Karl-Peter Farwerck, Worms; Lothar Schlemmer, Maxdorf, and Axel Sanner, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

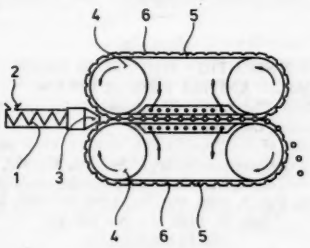
Filed Aug. 25, 1989, Ser. No. 398,663

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1988, 3830353

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[5] A61K *9/44, 9/20*

U.S. Cl. 424—467 **20 Claims**



1. A process for tabletting a mixture of

one or more pharmaceutical active compounds,

one or more pharmacologically acceptable thermoplastic polymers, said polymers having a Fikentscher K value of from 10 to 100, and

optional pharmaceutical auxiliaries,

said mixture having a glass transition temperature below the decomposition temperature of all components of said mixture

wherein said mixture is heated, without thermal and/or oxidative degradation, at a temperature of from 50° to 180° to render the mixture extrudable and said heated mixture is extruded at from 50° to 180° and the still formable extrudate is pressed between two belts or a belt and a roller to give tablets, said two belts or said belt and a roller making contact in parts, rotating in opposite directions and running parallel along a contact zone, at least one of said two belts or at least one of said belt and a roller having shape-imparting indentations.

5,073,380

ORAL SUSTAINED RELEASE PHARMACEUTICAL FORMULATION AND PROCESS

Suresh R. Babu, Lansdale; Robert Glinecke, Glenside; John L. Murtha, Holland, all of Pa., and Galen W. Radebaugh, Chester, N.J., assignors to McNeil-PPC, Inc., Milltown, N.J.

Continuation-in-part of Ser. No. 299,178, Jan. 19, 1989, abandoned, which is a continuation-in-part of Ser. No. 78,138, Jul. 27, 1987, Pat. No. 4,820,522. This application Jul. 9, 1990, Ser. No. 549,860

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[5] A61K *1/24*

U.S. Cl. 424—472 **20 Claims**

1. A process of preparing a pharmaceutical-sustained release shaped and compressed tablet characterized by a slow release of pharmaceutical active upon administration comprising the following steps:

A) forming a granulating agent by dissolving 5-25 parts by weight of the total composition of povidone in water or in an alcohol-water mixture;

B) blending together, in parts by weight of the total composition, the ,following ingredients, with sufficient water soluble pharmaceutical active to comprise about 66 to 93 percent by weight of the total composition, in dry powder form, 5-25 parts by weight hydroxyethyl cellulose and 5-25 parts by weight of a wicking agent;

C) adding and mixing the granulating agent from Step A to the blended powders from Step B, to form a wet granulation;

D) drying the wet granulation of Step C;

E) milling the dried granulation from Step D;

F) thoroughly blending the milled dried granulation from Step E with the following parts by weight of the total composition of ingredients in dry powder form: 2-15 parts by weight of a smoothness enhancer, 2-15 parts by weight erosion promoter, 5-45 parts by weight wicking agent, 0-10 parts by weight lubricant and 0-5 parts by weight glidant; and

G) compressing the final granulation from Step F into a tablet or tablet layer.

5,073,381

AMPHIPHILIC NETWORKS

Béla Iván; Joseph P. Kennedy, and Paul W. Mackey, all of Akron, Ohio, assignors to University of Akron, Akron, Ohio

Continuation-in-part of Ser. No. 232,444, Aug. 15, 1988, Pat. No. 4,942,204. This application Jun. 13, 1990, Ser. No. 537,508

Int. Cl.[5] A61K *9/14*

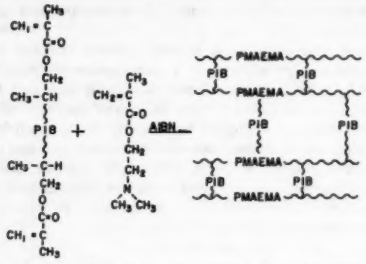
U.S. Cl. 424—487 **16 Claims**

1. A controlled and/or sustained drug release, amphiphilic composition comprising:

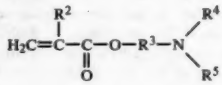
a network having hydrophobic segments and hydrophilic segments and impregnated with a pharmaceutically active agent;

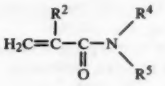
wherein said hydrophobic segment is an acryloyl or methacryloyl capped polyolefin or mixture thereof and said hy-

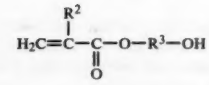
drophilic segment is a polyacrylate derived from an acry-



late selected from the class consisting of formulas (II), (III) and (IV)


(II)


(III)


(IV)

where R^2 is hydrogen or methyl, R^3 is an alkylene group of 2 to about 4 carbon atoms, and R^4 and R^5 may be the same or different and each is hydrogen or an alkyl radical of 1 to about 4 carbon atoms.

5,073,382

DIVALENT SILVER ALKALINE BACTERICIDE COMPOSITIONS

Marvin S. Antelman, Rehovot, Israel, assignor to N. Jonas & Co., Inc., Bensalem, Pa.

Filed May 9, 1991, Ser. No. 697,791
Int. Cl.[5] C02F *1/50*
U.S. Cl. 424—604 **1 Claim**

1. A bactericidal solid which when dissolved in water yields an alkaline solution capable of killing anaerobic colonies of bacteria, comprising an acid stabilized solution of an inorganic complex of divalent silver which has been neutralized by at least 40% of the total weight of the composition with puffed borax.

5,073,383

INHIBITING AGGREGATION IN FLUOROCARBON EMULSIONS

Robert T. Lyons, Cary, N.C., assignor to Affinity Biotech, Inc., Boothwyn, Pa.

Filed Apr. 21, 1989, Ser. No. 341,444
Int. Cl.[5] A61K *33/42, 31/025*
U.S. Cl. 424—606 **11 Claims**

1. Method of inhibiting aggregation in aqueous perfluorocarbon emulsion in contact with blood which comprises incorporating phosphate in a physiologically acceptable the emulsion in amount of at least 15 mM phosphate per liter of water contained in the emulsion, effective to inhibit said aggregation.

10. A blood substitute composition comprising a sterilized perfluorocarbon emulsion containing (a) water, (b) 10–50% perfluorocarbon, (c) surfactant and (d) a physiologically acceptable amount of at least 15 mM per liter of water of pharmaceutically acceptable phosphate salts added to said water prior to the sterilization of said emulsion; said composition being substantially free of aggregation for two hours with the blood being substituted.

5,073,384

MALTODEXTRIN/DEFOAMING COMPOSITION COMBINATE

William Valentine, and William K. Valentine, both of Lawrenceville, Ga., assignors to Valentine Enterprises, Inc., Lawrenceville, Ga.

Filed Oct. 19, 1989, Ser. No. 423,877
Int. Cl.[5] A61K *9/28, 9/14*
U.S. Cl. 424—474 **36 Claims**

1. An antifoaming or defoaming composition comprising a uniform, free flowing granular combinate of at least about 50 weight percent water soluble agglomerated maltodextrin having a particle size of less than 850 microns and simethicone in an amount up to about 50 weight percent.

5,073,385

BOEHMITE-TYPE ALUMINUM HYDROXIDE, PROCESS FOR PREPARING SAME AND PHOSPHATE ION ADSORBENT CONTAINING SAME AS EFFECTIVE COMPONENT

Takeshi Suzuki, Tokushima, and Mineaki Kabayama, Naruto, both of Japan, assignors to Tomita Pharmaceutical Co., Ltd., Tokushima, Japan

Filed Nov. 13, 1989, Ser. No. 434,177
Claims priority, application Japan, Nov. 14, 1988, 63-288592
Int. Cl.[5] A01N *59/06*
U.S. Cl. 424—630 **14 Claims**

1. A boehmite-type aluminum hydroxide which is represented by the formula

$$AlO(OH).xSO_4.nH_2O$$

wherein $0.01 < x < 0.10$ and $0 \leqq n < 1$.

5,073,386

Patent Not Issued For This Number

5,073,387

METHOD FOR PREPARING REDUCED CALORIE FOODS

Roy L. Whistler, West Lafayette, Ind., assignor to Lafayette Applied Chemistry, Inc., West Lafayette, Ind.

Filed Jan. 24, 1990, Ser. No. 469,153
Int. Cl.[5] A23L *1/00*
U.S. Cl. 426—7 **6 Claims**

1. In a method for modifying a food product containing carbohydrates and fat to have reduced calorie content by substituting non-digestible components for at least a portion of its digestible carbohydrate components, the improvement which comprises substituting a first portion of a cellulase hydrolysate of tamarind polysaccharide for a second portion of a digestible carbohydrate component of said food product.

5,073,388

AQUEOUS SOLUTION FOR USE IN PRODUCING A SOLID ANIMAL FEED SUPPLEMENT

Alex E. Miller, Placentia, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 271,599, Nov. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 876,993, Jun. 19, 1986, Pat. No. 4,800,092, which is a continuation-in-part of Ser. No. 828,149, Feb. 7, 1986, Pat. No. 4,798,727. This application Sep. 19, 1990, Ser. No. 587,161
Int. Cl.[5] A23K *1/02*
U.S. Cl. 426—74 **20 Claims**

1. An aqueous molasses based feed supplement stock solution consisting essentially of:

(a) 60 to 87 weight percent molasses having a solids concentration of about 60° to about 90° BRIX;

(b) at least about 0.8 weight percent dissolved magnesium ions; and

(c) dissolved calcium ions, wherein the weight ratio of the dissolved calcium ions to the dissolved magnesium ions is about 1.5 to about 3, and the solution is capable of remaining fluid for at least 7 days and is used in the manufacture of solid, acidic animal feed blocks.

5,073,389

MINERAL SUPPLEMENTED CANDY PRODUCT CONTAINING MULTIPLE DISCRETE REGIONS

Horst P. Wienecke, Gross-Gerau, Fed. Rep. of Germany, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 22, 1991, Ser. No. 643,979

Claims priority, application United Kingdom, Jan. 24, 1990, 9001621

Int. Cl.[5] A23G *3/00*; A23L *1/304*

U.S. Cl. 426—103 **12 Claims**

1. A mineral supplemented candy product having improved mineral bioavailability properties and which comprises a matrix of confectionery ingredients having distributed therein multiple discrete regions of a mineral supplement composition together with multiple discrete regions of a hardboiled candy composition and wherein the candy composition incorporates a potentiating agent selected from the group consisting of edible acids and water-soluble salts and mixtures thereof.

5,073,390

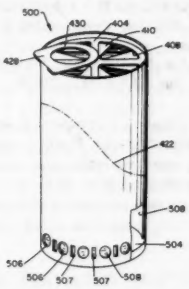
CONTAINER FOR HEATING OR COOKING A FOOD PRODUCT IN A HOT-AIR OVEN

Delos L. Knight, III, Cincinnati; Dale A. Panasewicz, Parma, and Craig M. Saunders, Rocky River, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 27, 1989, Ser. No. 344,168

Int. Cl.[5] A23L *1/00*; B65D *85/00*

U.S. Cl. 426—113 **20 Claims**



1. A single use container for heating a food product contained therein with an oven that generates a stream of heated air and has a heating chamber of predetermined cross-section, said container comprising:

(a) a body portion comprised of a sidewall panel having a lower end and an upper end, said body portion being shaped and sized so that its cross-section is substantially complementary to said cross-section of said heating chamber of said oven and such that the food product contained therein is loosely arrayed to allow agitation thereof;

(b) a top end panel releasably attached to said upper end of said sidewall panel, said top end panel having an inner surface and an outer surface;

(c) a bottom end panel attached to said lower end of said sidewall panel, said bottom end panel having an inner surface and an outer surface; and

(d) means in said container for allowing said stream of heated air generated by said oven to pass through said single use container when said container is in said heating chamber, the shape, size and location of said means in combination with the shape and size of the container relative to the heating chamber causing substantially all of said stream of heated air to pass through said container and around said food product contained therein, thereby heating said food product.

5,073,391

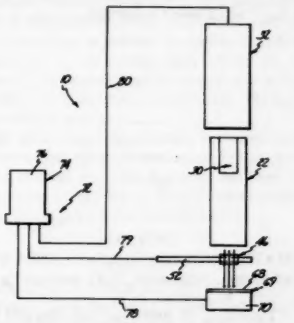
SEMI-SOLID FOOD DEPOSITOR AND METHOD OF USE

Jimmy A. DeMars, Hugo; Thomas P. Kempf, Brooklyn Park, both of Minn., and Greg Vargas, Madison, Wis., assignors to The Pillsbury Company, Minneapolis, Minn.

Filed Apr. 19, 1991, Ser. No. 688,640

Int. Cl.[5] A23L *1/00*; A21C *9/00*

U.S. Cl. 426—231 **15 Claims**



1. A method of controlling an amount of a semisolid food product deposited within a fixed area defined by a receptacle, such that a total weight of the amount of the semi-solid food product deposited within the fixed area falls within a preselected target weight range, comprises the steps of:

providing a mechanism for depositing the semi-solid food product within the fixed area;

depositing a first amount of semi-solid food product within the fixed area defined by the receptacle, the weight of the first amount of semi-solid food product being equal to or less than a predetermined target weight that falls within the preselected target weight range;

weighing the receptacle to determine a precise weight of the first amount of semi-solid food product deposited within the fixed area;

determining the difference between the precise weight of the first amount of semi-solid food product and the predetermined target weight; and

depositing a second amount of semi-solid food product if necessary within the fixed area, the weight of the second amount of semi-solid food product being based upon the difference between the precise weight and the predetermined target weight such the total weight of the semi-solid food product falls within the preselected target weight range.

5,073,392

PROCESS OF FORMING A MICROWAVEABLE FOOD PRODUCT HAVING A SELECTED COLOR

William A. Atwell, Andover; David J. Domingues, Plymouth; Paul J. Beckmann, Mendota Heights; Julio R. Panama, Blaine, and Steven K. Fahrenholtz, Plymouth, all of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Division of Ser. No. 339,567, Apr. 17, 1989. This application Nov. 8, 1990, Ser. No. 611,159

Int. Cl.[5] A23L *1/00*

U.S. Cl. 426—231 **5 Claims**

1. A method of forming a food product having a region of a preselected color comprising:

selecting at least one parameter from a group consisting of color producing agent, heating time value, color producing agent concentration value, final food color value, and substrate color value, each selected parameter defining an input parameter;

inputting each selected input parameter into a programmed computer means, the computer means programmed with a functional relationship between the selected input parameter and at least one other parameter included in the group, the computer means capable of providing output information, the output information defined as at least one of the parameters in the group other than the selected parameter; and

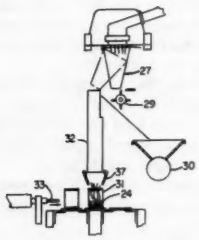
making a food product suitable for microwave heating according to the output information so that when the food product is exposed to microwave radiation, a food product of the desired color is formed.

5,073,393

AUTOMATIC PROPORTIONING PASTA SYSTEM

Leonard Defrancisci, Manhasset, N.Y., assignor to Defrancisci Machine Corp., Ridgewood, N.Y.

Filed Jan. 25, 1989, Ser. No. 301,627
Int. Cl.[5] A23L *1/00*
U.S. Cl. 426—508 **7 Claims**



1. A pasta preparation method comprising:

a. providing a predetermined portion of green pasta;

b. adding the predetermined portion of green pasta to a cup having a volume corresponding to the predetermined portion of the green pasta, and means for draining liquid at a substantially precisely controlled first rate;

c. filling the cup with hot water to maintain a level of the hot water above the pasta to cook the pasta, the hot water being added at a second rate greater than the first rate, the hot water having temperature and pressure sufficient to cook the pasta;

d. draining the cup at the first rate, the hot water filling being stopped and the cup being drained to a level below the pasta when the pasta has been cooked;

e. filling the cup with cool water to maintain a level of the cool water above the pasta to rinse the pasta, the cool water being added at a rate greater than the first rate, the cool water having a substantially precisely controlled temperature and pressure;

f. thereafter draining the cup at the first rate, the cool water filling being stopped and the cup being drained to a level below the pasta when the pasta has been rinsed; and

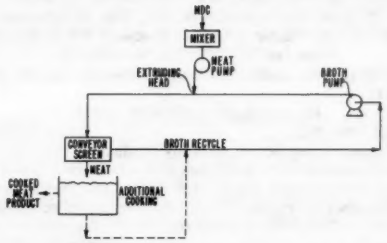
g. emptying the cooked and rinsed pasta into a container.

5,073,394

POULTRY STOCK FROM MECHANICALLY DEBONED MEAT

Roger L. Dake, Fayetteville; Jerry E. Webb, Farmington; Richard H. Forsythe, Fayetteville, and Rodney E. Wolfe, Springdale, all of Ark., assignors to Campbell Soup Company, Camden, N.J.

Filed Sep. 11, 1990, Ser. No. 580,545
Int. Cl.[5] A23L *1/00*
U.S. Cl. 426—509 **36 Claims**



1. A method for producing broth or stock from raw meat, said method comprising extruding said meat into a continuously circulating hot cooking medium and cooking said meat in said cooking medium to produce said broth or stock and cooked meat.

5,073,395

KONJAK FOOD GELLED BY VEGETABLE JUICE

Tokuzo Yamamoto, 10965-3, Yoshino-cho, Kagoshima-shi, Kagoshima 892, Japan

Filed Mar. 15, 1991, Ser. No. 670,434
Int. Cl.[5] A23L *1/0528*
U.S. Cl. 426—573 **5 Claims**

1. An aqueous konjak gel comprising about 3 to 5% by weight of a dry refined konjak flour, a juice obtained from calcium-containing vegetable leaves and calcium hydroxide as a calcium supplementing additive, in which a total content of calcium derived from said juice and calcium hydroxide is not less than 0.14% by weight based on water contained in the gel.

5,073,396

BEER FLAVORED WITH A NON-ACIDIC HOP-FLAVOR FRACTION

Paul H. Todd, Jr., Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalamazoo, Mich.

Continuation of Ser. No. 833,231, Feb. 28, 1986, Pat. No. 4,844,939, which is a continuation-in-part of Ser. No. 584,525, Feb. 28, 1984, Pat. No. 4,666,731. This application May 11, 1989, Ser. No. 350,311
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.
Int. Cl.[5] C12C *9/02*
U.S. Cl. 426—592 **2 Claims**

1. A beer flavored with a liquid, stable, resinous essentially non-acidic hop flavor fraction which is essentially devoid of alpha- and beta-acids.

5,073,397

METHOD FOR PREPARATION OF ULTRAFINE CITRUS FIBER AND DERIVATIVE FIBER-ENRICHED CITRUS BEVERAGES

Robert E. Tarr; Alice L. Burkes, both of Cincinnati, Ohio, and Susie H. Mills, Fort Thomas, Ky., assignors to Procter & Gamble Company, Cincinnati, Ohio

Filed Jul. 12, 1990, Ser. No. 552,280
Int. Cl.[5] A23L *2/02*
U.S. Cl. 426—599 12 Claims

1. A method for producing product citrus fiber having substantially dry, fine particulate form, said product fiber being adapted for addition to a citrus juice or beverage to increase the fiber content thereof;

said method comprising the following steps, in the order indicated:

(a) providing a wet, flexible, edible, unlimed citrus fiber feedstock comprising from about 60% to 99.99% citrus membrane, from 0.01% to about 40% peel, and from 0.001% to about 10% seed;

(b) at least one primary operation of chopping and concurrent drying followed sequentially by classifying; said primary operation at least partially reducing the size of the feedstock and reducing the moisture content of the feedstock to no more than about 15%; said operation being achieved by means of a first carrier-gas-swept mill having chopping blades, a static or dynamic classifier and recycle means; wherein the carrier gas has a carrier gas inlet temperature to the first mill, CGITI, which is in the range from about 120° C. to about 250° C., a carrier gas inlet flowrate, CGIFI, to the first mill of from about 100 to about 2000 cubic feet per minute per pound feedstock; and said first mill operates under a first mill recycle load, RLI, of from about 0.2 pounds to about 5 pounds per pound of chopped feedstock; and

(c) at least one secondary operation of grinding, optionally with concurrent drying; followed sequentially by dynamic classifying; said secondary operation taking the chopped feedstock produced in operation (b) to a final particle size in the range from about 50% to about 90% less than 50 microns; said operation being achieved by means of a second carrier-gas-swept mill having hammers, a dynamic classifier and recycle means; wherein the carrier gas has a carrier gas inlet temperature to the second mill, CGIT2, which is less than about 120° C.; and the second mill has a carrier gas inlet flowrate to the second mill, CGIF2, of from about 80 to about 2000 cubic feet per pound of chopped feedstock.

5,073,398

NATURAL FLAVORED VEGETABLE OIL

George Kuss, Memphis, Tenn., assignor to Kraft General Foods, Glenview, Ill.

Filed Sep. 10, 1990, Ser. No. 580,335
The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.
Int. Cl.[5] A23D *9/00*; A23L *1/221*
U.S. Cl. 426—613 8 Claims

1. A method for treating vegetable oil to provide a desired natural flavor of another oil comprising the steps of providing a natural first oil having a desired flavor,

heating said oil to a temperature of at least about 150° F.,

conducting an inert gas through said oil while maintaining the oil at a natural flavor volatilization temperature of at least about 150° F. to provide an inert gas flavorant stream containing natural volatile flavor components,

providing a second vegetable oil at a temperature less than said natural flavor volatilization temperature,

conducting said inert gas flavorant stream through said second vegetable oil while maintaining said vegetable oil at a temperature less than said volatilization temperature of said first oil to deposit natural flavorant components in said second vegetable oil to provide a vegetable oil which has a natural flavor volatiles from said first oil.

5,073,399

SIMULATED UNCOOKED EGG WITH SHAPED EGG-YOLK AND METHOD OF MAKING

Eustathios Vassiliou, 12 S. Townview La., Newark, Del. 19711

Filed Jul. 11, 1990, Ser. No. 551,160
Int. Cl.[5] A23L *1/32, 1/05*
U.S. Cl. 426—614 43 Claims

1. A simulated raw egg comprising: egg-white, the egg-white being liquid at room temperature; and

a homogeneous shaped monolithic separate phase of a simulated, non-flowable, egg-yolk disposed in the egg-white, said egg-yolk comprising an edible liquid, a colorant, and a thixotropic viscosity modifier which modifier comprises a positive thermoreversible gel former, said gel former being in an effective amount to render the edible liquid non-flowable, as to substantially retain its monolithic status in, and be substantially immiscible with the liquid egg-white at room temperature after the egg-yolk has been chilled, and

flowable at serving temperatures between cooking temperatures and room temperature for at least a finite period of time, after the egg-yolk has been brought to said serving temperatures from a higher temperature at which the egg-yolk becomes flowable.

5,073,400

SOFTNESS AND FLAVOR RETENTION IN RAISINS

Richard C. Bruno, Lodi; Teresa M. Freeto, and Tony R. Garcia, both of Fresno, all of Calif., assignors to Sun-Maid Growers of California, Kingsburg, Calif.

Filed Jul. 18, 1990, Ser. No. 554,622
Int. Cl.[5] A23L *00/00*
U.S. Cl. 426—639 11 Claims

1. A method for treating raisins to retain softness when incorporated into food preparations in which said raisins are in contact with dry absorptive food ingredients, said method comprising:

(a) blancing said raisins by contacting said raisins with water at a temperature of about 120° F. to about 190° F. for at least about one minute;

(b) infusing said raisins with fructose by continuously agitating said raisins in a liquid medium containing fructose as the sole saccharide at a temperature of from about 130° F. to about 200° F. for from about thirty seconds to about ninety seconds to raise the fructose:dextrose weight ratio in said raisins to from about 1.5:1 to about 2.0:1;

(c) tempering raisins so infused by retaining said raisins in an atmosphere which is in equilibrium with said liquid medium, at a temperature of from about 80° F. to about 120° F. for at least about 4 hours; and

(d) drying raisins so tempered in air at a temperature of about 175° F. or below.

5,073,401

AUTOMATED HYDROPONIC GROWING SYSTEM

Larry D. Mohr, 5936 S. Dorsey La., Tempe, Ariz. 85283

Filed Jun. 15, 1989, Ser. No. 367,186
Int. Cl.[5] A01C *1/04*
U.S. Cl. 426—658 6 Claims

1. A seed sheet structure for applying seed to a controlled growing environment such as a hydroponic growing unit for growing animal feed, said seed sheet comprising:

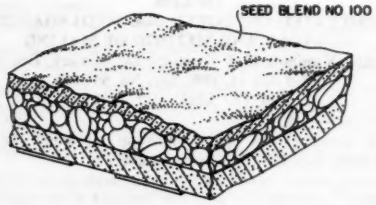
(a) a fibrous, sterilized substrate having a surface, said substrate being easily digestible by an animal;

(b) seed deposited on said surface;

(c) a biologically active material applied to one of the seed or substrate that upon activation will produce a digestive stimulant;

(d) said seed carrying substrate being hermetically sealed in

a package that will at least partially deteriorate upon hydration; and



(e) indicia associated with one of the seed substrates or packages for indicating the contents of the seed container.

5,073,402

METHOD OF MAKING AN OPTICAL DEVICE

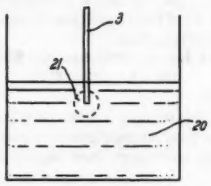
Brian Henderson, Ayrshire, United Kingdom, assignor to Medical Laser Technologies Limited of Research Park, Edinburgh, Scotland

Filed Mar. 15, 1990, Ser. No. 493,970

Claims priority, application United Kingdom, Mar. 16, 1989, 8906073; Sep. 7, 1989, 8920230; Feb. 13, 1990, 9003165

Int. Cl.[5] A01N *1/02;* **B05D** *3/06, 5/06*

U.S. Cl. 427—2 **9 Claims**



6. A method of making an isotropic optical device, comprising providing an optical fibre having a free end; contacting said free end with a curable light-scattering material; passing optical radiation through the fibre to the free end; scattering said optical radiation amongst said light-scattering material by impingement of said optical radiation from the fibre on said light-scattering material; and curing said light-scattering material by said impingement of optical radiation thereon to form an isotropic light-scattering member; wherein before curing said light-scattering material in contact with the free end is in the form of a droplet suspended in a liquid.

5,073,403

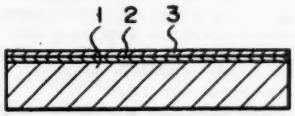
ALUMINUM-PLATED STEEL SHEET FOR CANS

Hiroshi Kagechika; Tadahiko Mishima, and Hiroshi Kibe, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Division of Ser. No. 280,147, Dec. 2, 1988, Pat. No. 4,906,533. This application Jan. 3, 1990, Ser. No. 460,353

Int. Cl.[5] C23C *14/32, 14/30, 14/16*

U.S. Cl. 427—38 **7 Claims**



1. A method of manufacturing an aluminum-plated steel for cans, comprising the steps of:

preparing a steel sheet;

forming a chromium layer on the surface of said steel sheet by ion plating; and

forming an aluminum layer on said chromium layer by plating.

5,073,404

SILICA COATING COMPOSITION FOR REFLECTIVE SHEETING

Tzuli J. Huang, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 303,143, Jan. 30, 1989, abandoned, which is a division of Ser. No. 151,541, Feb. 18, 1988, Pat. No. 4,844,976, which is a continuation-in-part of Ser. No. 23,375, Mar. 9, 1987, Pat. No. 4,755,425. This application Jul. 20, 1990, Ser. No. 555,380

Int. Cl.[5] B05D *5/06*

U.S. Cl. 427—39 **6 Claims**

1. A process for making a retroreflective sheet having a protective silica coating comprising the steps of:

A. preparing a protective coating composition by the steps of:

1) providing a transparent polymeric composition selected from the group consisting of acrylic polymers having a glass transition temperature of −20° to 60° in aqueous emulsion containing at least one solvent having a boiling point higher than that of water;

2) slowly mixing with the polymer from step (1) a silica sol, wherein the colloidal particle size is less than 50 nanometers, in such a proportion to the polymeric composition from step (1) that the SiO_2 content is 10–70 weight percent, of the total of SiO_2 plus the polymer solids from step (1);

B. providing a retroreflective sheet and coating said retroreflective sheet with the protective coating composition from step A; and

C. drying the coated retroreflective sheet from step B.

3. A coating composition which produces a transparent coating, comprising a mixture of colloidal silica aquasol wherein colloid particle size is less than 50 nanometers and a polymer composition selected from the group consisting of aliphatic polyurethanes having a molecular weight greater than 20,000 in water dispersion, aliphatic polyurethanes having a molecular weight greater than 20,000 in organic solvent, and acrylic polymers having a weight average molecular weight in the range of 300,000 to 350,000 and a glass transition temperature of −20° to 60° C. in aqueous emulsion containing at least one solvent having a boiling point higher than that of water in which mixture the silica comprises: 30 to 80 weight percent of the total of silica plus polymer solids for aliphatic polyurethane polymers; and 30 to 70 weight percent in the case of acrylic polymers.

5,073,405

APPLYING A TAPERED ELECTRODE ON A POROUS CERAMIC SUPPORT TUBE BY MASKING A BAND INSIDE THE TUBE AND DRAWING IN ELECTRODE MATERIAL FROM THE OUTSIDE OF THE TUBE BY SUCTION

Theodore R. Vasilow, Penn Township, Westmoreland County, and Gregory E. Zymboly, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 15, 1991, Ser. No. 641,390

Int. Cl.[5] B05D *5/12*

U.S. Cl. 427—105 **13 Claims**

1. A method of depositing a tapered electrode on a support tube comprising the steps:

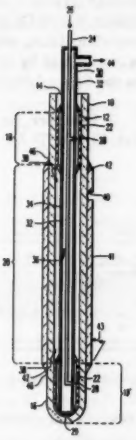
(1) providing a ceramic support tube, having a porous wall and two ends;

(2) masking at least one circumferential band inside of the tube, where at least the inside of one end of the tube is

masked, leaving at least one unmasked band inside of the tube;

(3) evacuating air from inside of the tube, to provide a permeability gradation in the tube wall between masked and unmasked circumferential bands;

(4) applying a liquid dispersion of solid electrode material particles to the outside surface of the evacuated tube, wherein liquid flows through the support tube wall, the



particles coat a uniform deposit thickness on the outside surface over the unmasked inner bands of the tube where there is unrestricted liquid flow, and coat a tapered deposit thickness on the outside surface over at least part of the masked inner bands of the tube where there is restricted liquid flow, with the thinnest part of the taper near the ends of the support tube; and

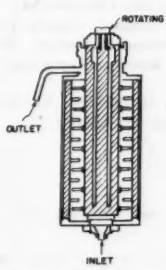
(5) sintering the applied deposit on the support tube.

5,073,406

METHOD OF PRODUCING A MAGNETIC RECORDING MEDIUM

Masatoshi Takahashi; Hiroo Inaba, and Kazuaki Taga, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 9, 1991, Ser. No. 682,767
Claims priority, application Japan, Apr. 10, 1990, 2-94655
Int. Cl.[5] H01F *10/02*
U.S. Cl. 427—131 **14 Claims**



1. A method of producing a magnetic recording medium comprising steps of kneading and dispersing ferromagnetic powder, binder and non-ferromagnetic powder to obtain magnetic coating solutions, and applying a plurality of the magnetic coating solutions on a non-ferromagnetic substrate to form a plurality of magnetic layers on the substrate, wherein, in the step of said kneading and dispersing, a magnetic coating composition containing said ferromagnetic powder and a solvent of 15 to 30 wt % of the ferromagnetic powder is at first kneaded by a two-shaft continuous kneading and mixing machine and then dispersed by a pin type sand grinder to obtain a first magnetic solution, and another magnetic coating composition containing said ferromagnetic powder and a solvent of 30 to 50 wt % of the ferromagnetic powder is at first, kneaded by a double-arm open kneader and then dispersed by a pin type sand grinder, and finally dispersed by a disk type sand grinder to obtain a second magnetic coating solution, and, in the step of said applying the magnetic solutions on the non-ferromagnetic substrate, said first magnetic coating solution is at first applied on said substrate and then said second magnetic coating solution is applied thereon.

5,073,407

METHOD OF TREATING A SURFACE

Richard Frazer, Williamsville, N.Y., assignor to Crescent Marketing, Inc., Eden, N.Y.

Filed Jul. 13, 1990, Ser. No. 552,702
Int. Cl.[5] B05D *5/00, 3/12*
U.S. Cl. 427—160 **21 Claims**

1. A method of treating a surface to form a protective coating thereon consisting essentially of a surfactant, which method comprises the steps of:

mixing the surfactant with water to form a treatment solution, wherein the surfactant is a non-water soluble surfactant and is present in an amount between about five percent to about fifteen percent by volume of the treatment solution;

applying the treatment solution to the surface to be protected to thereby wet the surface;

rubbing the solution wetted surface until a tacky residue forms on the surface; and

rubbing the tacky residue on the surface until the surface is wiped free of any streaks so that all that remains on the surface is the protective coating consisting essentially of the surfactant.

5,073,408

METHOD OF DEPOSITING A SILICON DIOXIDE FILM

Takuji Goda; Hirotsugu Nagayama, both of Nishinomiya, and Hideo Kawahara, Toyonaka, all of Japan, assignors to Nippin Sheet Glass Co., Ltd., Osaka, Japan

Continuation of Ser. No. 338,503, Apr. 14, 1989, abandoned, which is a continuation of Ser. No. 869,423, Jun. 2, 1986, abandoned. This application Sep. 7, 1990, Ser. No. 580,356
Claims priority, application Japan, Jun. 6, 1985, 63-123254
Int. Cl.[5] B05D *5/06*
U.S. Cl. 427—169 **17 Claims**

1. A method for depositing a silicon dioxide film on a substrate comprising the steps of:

(a) preparing a hydrosilicofluoric acid solution substantially saturated with silicon dioxide at a first temperature of not more than 15° C.,

(b) increasing temperature of the solution prepared in step (a) to a second temperature at least 10° C. higher than the first temperature and obtaining a hydrosilicofluoric acid solution supersaturated with silicon dioxide to an extent necessary for depositing the silicon dioxide film on a surface of the substrate, and

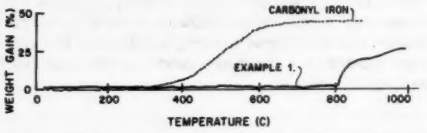
(c) contacting the substrate with the solution resulting from step (b) and depositing the silicon dioxide film on the surface of the substrate.

5,073,409

ENVIRONMENTALLY STABLE METAL POWDERS

Iver E. Anderson, Ames, Iowa, and Jack D. Ayers, Oakton, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 28, 1990, Ser. No. 545,005
Int. Cl.[5] B05D 7/14
U.S. Cl. 427—217 15 Claims



1. A method of preparing an environmentally stable metal powder coated with a protective film during a gas atomization process comprising:

(a) mixing a metal alloy with a sufficient amount of a metal alloy addition agent which is compatible with the metal alloy and which will react with the atomization gas during the gas atomization production process to form a film on the metal powder;

(b) heating said mixture of a metal alloy with said metal alloy addition agent to a temperature at which said alloy and said alloy addition agent melt and form a molten mixture of said metal alloy and said alloy addition agent;

(c) atomizing said molten mixture with an atomizing gas having a sufficient amount of a reactant gas to react with the alloy powder produced by the gas atomization process, whereby a metal alloy powder is produced during the gas atomization producing process having a thin protective film on the metal powder.

5,073,410

THIN FILMS OF METAL PHOSPHATES AND THE METHOD OF THEIR FORMATION

Gustavo R. Paz-Pujalt, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1989, Ser. No. 421,889
Int. Cl.[5] B05D 3/02
U.S. Cl. 427—226 17 Claims

1. A method of formation of a layer of metal phosphate comprising mixing non-phosphorous containing metal coordination complexes and phosphorous coordination complexes, coating the mixture onto a substrate to form a metal phosphate precursor layer, and heating the precursor layer to form a metal phosphate layer wherein said metal phosphate comprises phosphates of at least one member of the group consisting of lithium, sodium, potassium, magnesium, strontium, and barium.

5,073,411

PROCESS FOR FORMING A SURFACE OXIDIZED BINDING LAYER ON HARD SUBSTRATES

Thomas E. Hale, Warren, Mich., assignor to Carboloy, Inc., Detroit, Mich.

Continuation of Ser. No. 255,825, Oct. 11, 1988, abandoned, which is a continuation of Ser. No. 661,804, Oct. 17, 1984, abandoned, which is a division of Ser. No. 331,368, Dec. 16, 1981, abandoned. This application Jul. 9, 1990, Ser. No. 549,556
Int. Cl.[5] C23C 16/00; B05D 1/38
U.S. Cl. 427—252 18 Claims

1. A process of pretreating a hard metal carbide substrate or cemented carbide substrate for the reception of wear resistant oxide coatings in the absence of a cobalt diffusion step which comprises:

(a) contacting the substrate at a temperature of 800° C. to 1300° C. with a first atmosphere selected from metal carbide and oxycarbide forming gaseous atmospheres to form a bonding layer of at least one carbide or oxycarbide of a metal selected from tantalum, niobium or vanadium on said substrate; and

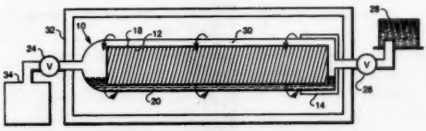
(b) heating the coated substrate of (a) at a temperature of 800° C. to 1300° C. an oxidizing, gaseous atmosphere until at least a portion of the surface of said bonding layer is oxidized.

5,073,412

METHOD OF INTERCALATING LARGE QUANTITIES OF FIBROUS STRUCTURES

James R. Gaier, Strongsville, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Nov. 2, 1990, Ser. No. 608,493
Int. Cl.[5] B05D 7/24
U.S. Cl. 427—294 4 Claims



1. A method for intercalating highly graphitized fiber comprising:

assembly spools of pitch based graphite fibers;

weaving said fibers into cloth;

rolling said cloth into a cloth cylinder

inserting said cloth cylinder into a tubular chamber;

sealing said chamber with said cloth cylinder therein;

evacuating said chamber;

introducing a bromine intercalate in a liquid phase into said chamber;

rotating said chamber thereby submerging said cloth cylinder in said intercalate to produce a reaction therebetween culminating in intercalation;

removing excess intercalate from said chamber;

purging intercalate residue from said cloth cylinder;

removing said cloth cylinder from said chamber;

unrolling said cloth cylinder thereby forming a substantially flat mat; and

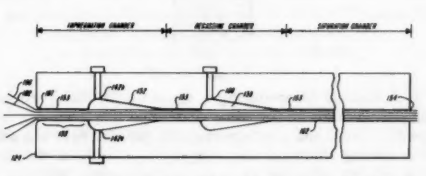
drying said flat mat in ambient air.

5,073,413

METHOD AND APPARATUS FOR WETTING FIBER REINFORCEMENTS WITH MATRIX MATERIALS IN THE PULTRUSION PROCESS USING CONTINUOUS IN-LINE DEGASSING

Christian Koppernaes, Bedford, Canada; Stephen G. Nolet, Leominister, and Jerome P. Fanucci, Arlington, both of Mass., assignors to American Composite Technology, Inc., Boston, Mass.

Filed May 31, 1990, Ser. No. 531,508
Int. Cl.[5] B05D 3/12
U.S. Cl. 427—356 2 Claims



1. A method for wetting fiber reinforcements with matrix material in a pultrusion process comprising the steps of:

a. closely associating the fiber reinforcements into a tow;
b. passing the tow into an inlet port, through an internal cavity and out an outlet port of a pultrusion die said inlet port and outlet port each sized so that the tow passing through the port substantially pneumatically seals the inside of the pultrusion die from the atmosphere outside of the die;
c. simultaneously performing the following two steps:
i. impregnating the tow with matrix material by injecting matrix material at a first pressure into the tow through a first port in an enlarged cavity portion of the pultrusion die; and
ii. degassing the impregnated tow by applying at a second port in said enlarged cavity portion of the pultrusion die a means for reducing pressure inside the cavity to below the first pressure.

5,073,414

FLAME SPRAYING PROCESS

Cesar O. Castro, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 30, 1990, Ser. No. 503,417
Int. Cl.[5] B05D *1/08*
U.S. Cl. 427—423 **8 Claims**

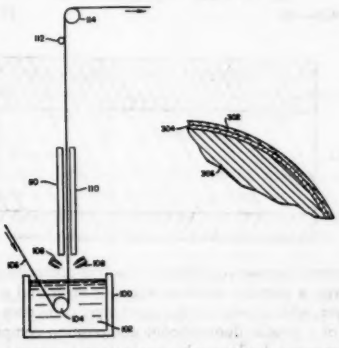
1. A process for coating a solid object with a polymeric material comprising heating the powdered polymeric material comprising a blend of a polybutylene homopolymer or copolymer, having a melt index between about 1 and about 1000, with from about 1 to about 35 percent by weight of the total polymeric material an adhesion promoter selected from the group consisting of ethylene-methacrylic acid copolymer and ethylene vinyl acetate copolymer to substantially melt the polymeric material and thereafter propelling the substantially molten polymeric material by flame spraying onto the surface of the solid object, thereby forming a coating wherein said powdered polymeric material has a particle size from about 20 mesh to about 100 mesh.

5,073,415

APPARATUS FOR COATING AN IRON BASED METAL WITH A LIQUID PROTECTIVE METAL AND METHOD

Thomas A. Taylor, Indianapolis, and Robert C. Tucker, Jr., Brownsburg, both of Ind., assignors to Union Carbide Coatings Service Technology Corporation, Danbury, Conn.

Continuation of Ser. No. 213,270, Jun. 28, 1988, abandoned, which is a continuation of Ser. No. 863,448, May 12, 1986, abandoned. This application Nov. 30, 1989, Ser. No. 442,462
Int. Cl.[5] B05D *1/18*
U.S. Cl. 427—433 **28 Claims**



1. An apparatus for coating an iron-based substrate with a coating of a protective zinc metal alloy or compound which comprises;
(a) a vessel means containing a molten protective metal of a zinc alloy or compound;
(b) means for immersing an iron-based substrate into the molten protective metal to coat the iron-based substrate with the protective metal coating,
(c) means disposed in the atmosphere outside of said vessel means for directing the iron-based substrate from the molten protective metal, the directing means comprising a roll having a metal understructure and a coating of yttria stabilized zirconia for providing a contact surface which engages the protective zinc metal coating when the protective metal is still in a plastic state, and wherein said coating of zirconia has a thickness between 20 and 500 microns and a surface finish of no more than about 20 microinches rms for preventing adhesion to the protective metal.

5,073,416

ARTICLES FROM MIXED SCRAP PLASTICS

Roger W. Avakian, Dalton; Shashi L. Parekh; Popkin Shenian, both of Pittsfield, and Erich O. Teutsch, Richmond, all of Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 21, 1988, Ser. No. 274,115
Int. Cl.[5] B65D *71/00*; B32B *5/06*
U.S. Cl. 428—2 **16 Claims**

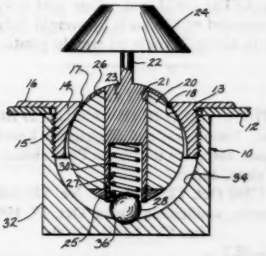
1. An article produced from mixed scrap plastic, said article comprising:
(a) from 20% to 80% by weight of mixed scrap plastic based on the total weight of said article, said mixed scrap plastic comprising (i) from 20% to 70% by weight of a polycarbonate resin based on the total weight of said mixed scrap plastic, (ii) from 5% to 50% by weight of polybutyleneterephthalate resin based on the total weight of said mixed scrap plastic, and (iii) from 1% to 10% by weight of polyurethane based on the total weight of said mixed scrap plastic; and
(b) from 20% to 80% by weight of chopped glass fibers based on the total weight of said article, said fibers having an average length of at least 0.25 inches.

5,073,417

VEHICLE ORNAMENT MOUNTING APPARATUS

Stanley C. Bowerman, 2914 S. Orleans Ave., West Allis, Wis. 53227

Filed Oct. 30, 1990, Ser. No. 605,888
Int. Cl.[5] B60R *13/00*
U.S. Cl. 428—31 **15 Claims**



1. A mechanism for attaching an ornament to a vehicle comprising:
a bracket for coupling to the vehicle and having a first aperture therethrough;
an assembly rotatably within the first aperture and having a means extending outwardly from the bracket for attaching the ornament thereto; and
a retainer attached to and captivating said assembly within the aperture of said bracket, said retainer having a par-

tially spherical second concave surface engaging said assembly.

5,073,418

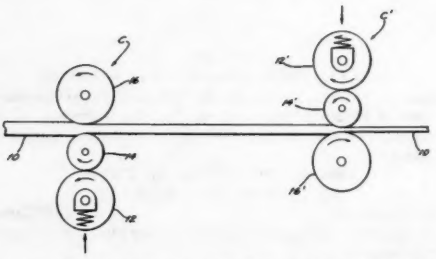
LOW PERMEABILITY FABRIC, AIRBAG MADE OF SAME AND METHOD OF MAKING SAME

Peter B. Thornton, Bronxville; Stanley H. Cone, and George W. Booz, both of Hornell, all of N.Y., assignors to Stern & Stern Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 264,158, Oct. 28, 1988, Pat. No. 4,977,016. This application Aug. 9, 1990, Ser. No. 565,267

Int. Cl.[5] B60R *21/16*

U.S. Cl. 428—34.9 **29 Claims**



1. An airbag including a bag of strong, lightweight, thin, flexible fabric of low permeability comprising an uncoated woven cloth characterized by a permeability of not more than one cubic foot of air per minute per square foot of cloth (0.5 $cm^3/sec/cm^2$) at a pressure drop of 0.5 inch of water (1.27 cm) across the cloth.

5,073,419

FILM COMPOSITE AND PACKAGED TIRE THEREWITH

Bharat K. Kansupada, Mogodore; Martin A. Phillips, Jr., Stow, and Ottavio J. Mallamaci, North Canton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 8, 1989, Ser. No. 320,348

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—35.4 **10 Claims**

1. A package comprised of a toroidally shaped pneumatic rubber tire having a film composite of a low density polyethylene (LLDPE) film substrate with a polyvinylalcohol coating thereon, spirally stretch wrapped around its toris in a helical fashion with the polyvinylalcohol coating thereof positioned against the surface of said tire; wherein said LLDPE has a recovery value in a range of about 20 to about 40 percent according to ASTM D822 and where said polyvinylalcohol coating is comprised of 100 parts by weight polyvinylalcohol and about 10 to about 30 parts by weight plasticizer therefor.

5,073,420

MULTI-LAYERED BLOW-MOLDED BOTTLE

Katsumi Yano, Yokohama, and Shigemitsu Kambe, Kawasaki, both of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Filed Oct. 12, 1989, Ser. No. 420,164

Claims priority, application Japan, Oct. 17, 1988, 63-259551

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—35.7 **8 Claims**

1. A multi-layered blow-molded bottle comprising at least two layers of a polyolefin resin (A), at least two layers of an adhesive resin (B) prepared by melt-reacting an olefin polymer (b_1) with a rubber (b_2) and an unsaturated carboxylic acid or a derivative thereof (b_3) in the presence of an organic peroxide to obtain a product and adding a rubber (b_4) to the product to melt-mix them with each other, and at least one layer of a barrier resin (C) selected from the group consisting of polyamide, polycarbonate, polyester, polyvinylidene chloride and saponified ethylene-vinyl acetate polymer resins, which are laminated in the order of A/B/C/B/A.

5,073,421

LAMINATED MATERIAL FOR PACKAGING PHOTOGRAPHIC MATERIALS

Mutsuo Akao, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

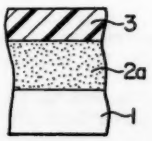
Continuation of Ser. No. 628,444, Jul. 6, 1984, Pat. No. 4,950,512. This application May 30, 1990, Ser. No. 530,747

Claims priority, application Japan, Jul. 9, 1983, 58-124103

The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—35.8 **24 Claims**



1. A laminated material for packaging photographic materials, which comprises:

(a) a middle layer comprising a thermoplastic resin layer which comprises a reclaimed resin or a resin containing photographically active substances adversely affecting photographic materials by migrating to the innermost surface of the laminated material,

(b) a photographically inactive outer layer having gas-permeability comprising at least one of a thermoplastic resin layer and a flexible sheet layer with at least one of pores and bores, and

(c) a photographically inactive inner layer adapted to be in closer proximity to the photographic material than the middle and outer layers and having a lower gas permeability than the outer layer (b) and comprising a flexible sheet layer wherein the gas permeability of the outer layer is at least 1.2 times greater than the gas permeability of the inner layer.

5,073,422

PRESSURE-SENSITIVE ADHESIVE STRUCTURE

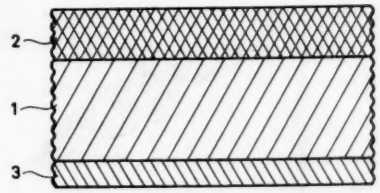
Hiroki Konno, and Hirofumi Kishita, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,320

Claims priority, application Japan, Nov. 12, 1987, 62-313347

Int. Cl.[5] C09J *7/02*; B32B *27/28*

U.S. Cl. 428—40 **17 Claims**



1. A pressure-sensitive adhesive structure comprising a substrate layer, a pressure-sensitive adhesive layer and a release agent layer, wherein said release agent layer comprises a cured product of a curable fluorosilicone composition comprising:

(a) an organopolysiloxane having in its molecule at least two silicon-bonded alkenyl groups and containing in its molecule at least one member selected from the group consist-

ing of silicon-bonded fluorine-containing substituents represented respectively by Formulas (1) to (2):

$$F(CFCF_2O)_nCFCF_2OCH_2CH_2CH_2- \quad (1)$$
$$\quad\quad|\quad\quad\quad|$$
$$\quad CF_3 \quad\quad CF_3$$

where n is an integer of 1 to 5,

$$F(CFCF_2O)_nCFCH_2OCH_2CH_2CH_2- \quad (2)$$
$$\quad\quad|\quad\quad\quad|$$
$$\quad CF_3 \quad\quad CF_3$$

where n is an integer of 1 to 5,

(b) an organohydrogenpolysiloxane having in its molecule at least three silicon-bonded hydrogen atoms; and

(c) a catalyst for addition reaction between said silicon-bonded alkenyl groups and said silicon-bonded hydrogen atoms;

the proportion of said silicon-bonded hydrogen atoms in Component (b) to said silicon-bonded alkenyl groups in Component (a) being at least 0.5.

5,073,423

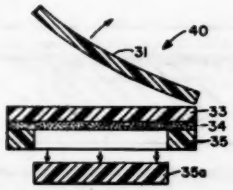
DECALCOMANIA

Ronald E. Johnson, Tioga, Pa.; Richard W. Thompson, Big Flats, and Lung-Ming Wu, Horseheads, both of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Jan. 4, 1990, Ser. No. 461,057

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—40 **29 Claims**



1. A laminated heat release or pressure release decal for application to a surface of an article which comprises:

(a) a support layer comprising a disposable release film;

(b) an abrasion resistant layer exhibiting a tensile elongation greater than 50%; and

(c) a heat activated or pressure sensitive adhesive layer atop said abrasion resistant layer.

5,073,424

MULTI-COLORED ONE-STEP SIGN

Donald R. Dressler, 22 Colony Cir., Glastonbury, Conn. 06033

Filed Jan. 31, 1990, Ser. No. 472,840

Int. Cl.[5] B32B *7/06*

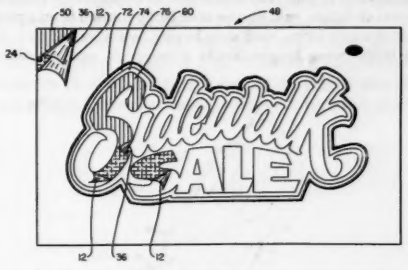
U.S. Cl. 428—42 **16 Claims**

1. A substantially flat laminated web for making a sign having at least two opaque colors, comprising:

a base sheet having an upper surface of plastic material, the base sheet defining one of the opaque sign colors;

a graphics film layer covering and laminated to the base sheet, and defining a non-adhesive graphics layer upper surface having another sign color different from the base color and a graphics layer lower surface adhering to and peelable from the upper surface of the base sheet, and base sheet upper surface, graphics layer upper surface and graphics layer lower surface having respective peel values between each other;

wherein the peel value between the graphics layer lower surface and the base sheet upper surface is greater than the



peel value between the graphics layer lower surface and the graphics layer upper surface.

5,073,425

POLYVINYL CHLORIDE SURFACE COVERING COMPOSITIONS HAVING REDUCED ELECTRICAL RESISTIVITIES

Martin Dees, Jr., Landisville; Richard E. Felter, Lancaster, and Deborah L. Musser, Columbia, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Oct. 7, 1988, Ser. No. 255,031

Int. Cl.[5] E04F *15/16*

U.S. Cl. 428—48 **22 Claims**

1. A surface covering having a reduced surface resistivity which minimizes or avoids unattractive appearances that are characteristic of the combination of cationic anti-stats with polyvinyl chloride, comprising a sheet material having a top wear layer, said wear layer including a polymer of vinyl chloride, a stabilizer, and a plasticizer; and an interlayer of a plastisol formulation, said plastisol formulation including a polymer of vinyl chloride, a filler, a stabilizer, a plasticizer, and a quaternary ammonium salt anti-stat additive, wherein the anti-stat additive is present in the interlayer in an amount of at least about 3 parts per hundred parts of polymer, said amount being effective to increase the static dissipative rate of the wear layer wherein the wear layer either: (1) has no added anti-stat, (2) has only a non-ionic anti-stat in an amount of from about 2 to about 4 parts per hundred parts of polymer, (3) is pigmented and has a quaternary ammonium salt anti-stat in an amount less than about 5.5 parts per hundred parts of polymer, or (4) is clear and has a quaternary ammonium salt anti-stat in an amount less than about 2.5 parts per hundred parts of polymer; and further wherein the interlayer contains more quaternary ammonium salt antistat than is contained in the wear layer.

5,073,426

CORE ARRANGEMENT IN MINERAL WOOL SANDWICH PANEL

Kasper Blaauw, Tolbert, Netherlands, assignor to Hunter Douglas International N.V., Willemstad, Netherlands Antilles

Filed May 4, 1990, Ser. No. 518,897

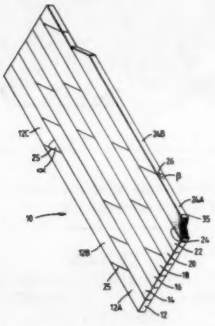
Claims priority, application United Kingdom, May 4, 1989, 8910220

Int. Cl.[5] B32B *3/10*

U.S. Cl. 428—56 **7 Claims**

1. A sandwich panel element comprising a fibrous core

formed of a multiplicity of fibers, said core having front and rear faces, first and second parallel outer skins of generally planar sheet material adhered to said front and rear faces, respectively, of said core and means to connect said panel to a support structure, said fibrous core being formed from a plurality of elongate strips, each strip having two sides and two ends, said strips being longitudinally arranged in side-by-side and



end-to-end abutting relation, the elongate strips each being arranged so that the fibers extending generally transverse to the planes of said sheet material skins, the strips individually being shorter than the length or width of the panel element, at least the mutually abutting ends of the strips being chamfered at an acute angle to the longitudinal direction of the strip, to allow the ends to overlap.

5,073,427

SUBSTRATE OF OPTICAL DISC

Yoshinori Suga, Tokyo; Eiji Tanaka, Kanagawa; Satoshi Kato, and Kaoru Sato, both of Tokyo, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jul. 27, 1990, Ser. No. 558,537

Claims priority, application Japan, Jul. 28, 1989, 1-195961

Int. Cl.[5] B32R *3/02*

U.S. Cl. 428—64 **6 Claims**

1. A substrate for an optical disc comprising a transparent hydrocarbon resin having a softening point of not less than 100° C. and containing an alicyclic structure in the main chain or side chain thereof, the surface thereof having been contact treated with a fluorine-containing gas so that the treated surface has a contact angle with water of not more than 90°, the treatment depth measured by secondary ion mass spectroscopy is 2,000 Å or less and the weight gain due to the treatment does not exceed 1% by weight.

5,073,428

FOLDABLE PLASTIC PRODUCT

Charles J. Lancelot, Winchester; Anthony F. Shaw, Bluemont, and Edward O. Tate, Jr., Berryville, all of Va., assignors to Rubbermaid Incorporated, Wooster, Ohio

Filed Oct. 10, 1989, Ser. No. 418,605

Int. Cl.[5] B32B *3/10, 3/08*

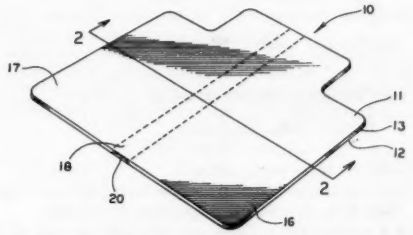
U.S. Cl. 428—67 **14 Claims**

1. A foldable plastic product comprising:

a sheet of material including at least two panels having a planar upper surface, a lower surface and sides spanning said upper and lower surfaces defining the thickness of said sheet;

at least one bridge portion having an uninterrupted planar upper surface and a lower surface, said upper surface integrally connecting the upper surfaces of said panels and being coplanar therewith, the thickness of said bridge portion being less than the thickness of said panels;

at least one hinge portion of a cycloidal configuration and having an upper surface coincident with the lower surface of said bridge portion and an uninterrupted lower surface integrally connecting the lower surface of said panels and being coplanar therewith, said hinge portion being formed of a material selected from the group consisting of ther-



moplastic polyurethanes, thermoplastic polyesters, natural and synthetic rubbers and plasticized•polyvinylchlorides having a Shore A hardness of about 55 to about 85 durometer.

5,073,429

DOOR PANEL

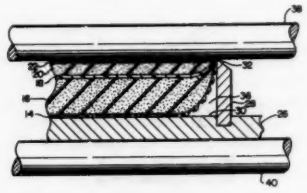
David M. Steinke, Baltimore; Michael Blankenship, Pataskala; Marshall G. Satterfield, Johnstown, and Philip D. Gardner, Sr., Findlay, all of Ohio, assignors to Process Bonding, Inc., Johnstown, Ohio

Division of Ser. No. 439,172, Nov. 20, 1989, Pat. No. 4,996,090.

This application Feb. 14, 1991, Ser. No. 655,057

Int. Cl.[5] B32B *3/26*

U.S. Cl. 428—71 **20 Claims**



1. A composite panel comprising, a series of layers bonded together having two faces and an edge periphery,

one face comprising a layer of decorative material, adjacent said periphery said decorative material curing toward a second face to define a convex surface terminating at said periphery,

said decorative material being bonded to one side of a first foamed resin layer by an adhesive at least partially impregnating said foam, said foam being open celled

means adhered to said composite panel for connecting the panel to a substrate and

the periphery of said panel being compressed to a minimal thickness with the decorative material terminating substantially at said second face.

5,073,430

TRIM STRIP

S. Bruce Aidan, 17 Lickhill Rd., Stourport, Worcestershire, DY13 8SE,, England

Filed Apr. 16, 1990, Ser. No. 510,128

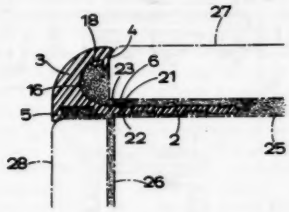
Claims priority, application Bulgaria, Apr. 20, 1989, 8909020

Int. Cl.[5] E04C *2/38;* **B32B** *3/06*

U.S. Cl. 428—43 **12 Claims**

1. A trim strip adapted for use as an edging for ceramic tile wall, floor or other surface coverings comprising a body having an anchorage portion and an integral edge portion which projects from said anchorage portion and has an abutment part

remote from said anchorage portion adapted to abut against the edge of an adjacent tile when the trim strip is fitted for use, and a platform removably attached to said anchorage portion which projects towards said abutment part and serves in use of the trim strip to lift a tile or tile edge away from said anchorage



portion for abutting engagement of said abutment part with the tile, said platform being removable to enable, alternatively, a thicker tile or tile section to be engaged with said anchorage portion and have abutting engagement with said abutment part.

5,073,431

METHOD OF EMBODYING MULTI-PLY LAMINATES WITH AN EXTERNAL PLY IN QUALITY WOOD OR VEGETABLE TISSUE, FOR VENEERING AND FOR USE IN MANUFACTURING STITCHED GOODS, AND THE PRODUCT OBTAINED WITH SUCH A METHOD

Alberto Martinuzzo, Gorgo al Monticano, Italy, assignor to Flexible S.r.l., Bologna, Italy

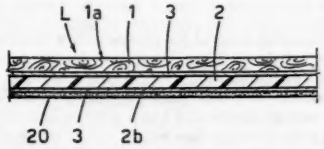
PCT No. PCT/IT89/00022, § 371 Date Nov. 30, 1989, § 102(e) Date Nov. 30, 1989, PCT Pub. No. WO89/09130, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 31, 1989, Ser. No. 455,374

Claims priority, application Italy, Apr. 1, 1988, 40052 A/88

Int. Cl.[5] B32B *3/06, 7/08*

U.S. Cl. 428—102 **7 Claims**



1. A method of embodying multi-ply laminates with an external ply in quality wood or vegetable tissue for use in manufacturing of stitched goods, characterized in that it comprises the steps of:

bonding a veneer (1) under pressure to a thin flat film (2) of flexible and thermoplastic material by way of a layer (3) of thermoplastic adhesive, in such a way as to form a laminate (L) having exposed and reverse surfaces (1*a*, 2*b*) which are devoid of irregularities; and

bonding the laminate (L) under pressure by way of a further layer (3) of thermoplastic adhesive onto a close-woven backing fabric (20), offered to an entire surface (2*b*) of the film of thermoplastic material (2) opposite that bonded to the veneer, which is impermeable to a further layer of adhesive (3) sandwiched between the fabric and the film.

7. A product obtained by implementation of the method of claim 1, characterized

in that it consisting in a veneer (1) of quality wood or vegetable tissue, a thin flexible film (2) of thermoforming plastic material, and a backing fabric (20) bonded one to the next over their entire surface areas by way of a first layer of thermoplastic adhesive (3) sandwiched between the veneer (1) and the film (2), and a second layer of thermoplastic adhesive (3) sandwiched between the film (2) and the fabric (20);

in that with its entire area bonded to the plastic film (2) by way of the adhesive (3), the veneer (1) exhibits an exposed surface (1*a*) that is devoid of irregularities; and

in that the backing fabric (20) presents a close weave such as will ensure impermeability to the adhesive (3) sandwiched between its own surface and that of the plastic film (2), and affords a base of strength sufficient to receive a stitch.

5,073,432

HONEYCOMB STRUCTURE AND METHOD OF PRODUCING THE SAME

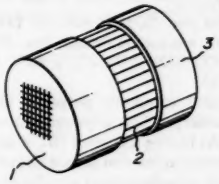
Osamu Horikawa, Toyoake; Takashi Harada, Nagoya, and Koichi Ikeshima, Okazaki, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Jul. 28, 1989, Ser. No. 386,203

Claims priority, application Japan, Aug. 2, 1988, 63-192006

Int. Cl.[5] B32B *3/12*

U.S. Cl. 428—116 **4 Claims**



1. A cylindrical ceramic honeycomb structure comprising an outer surface wall surrounding and encompassing a plurality of partition walls and through-holes, at least one portion of said outer surface having a coarser surface roughness than a remaining portion of said outer surface resulting from partial melting of said at least one portion of said outer surface.

5,073,433

THERMAL BARRIER COATING FOR SUBSTRATES AND PROCESS FOR PRODUCING IT

Thomas A. Taylor, Indianapolis, Ind., assignor to Technology Corporation, Danbury, Conn.

Filed Oct. 20, 1989, Ser. No. 424,613

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—134 **20 Claims**

1. A thermal barrier coating for substrates comprising zirconia partically stabilized by yttria and having a density greater than 88% of the theoretical density with a plurality of vertical macrocracks substantially homogeneously dispersed throughout the coating in which a cross-sectional area of the coating normal to the substrate exposes a plurality of vertical macrocracks with at least 70% of said vertical macrocrack extending at least 4 mils in length up to the thickness of the coating and having from 20 to 200 vertical macrocracks per linear inch measured in a line parallel to the surface of the substrate and in a plane perpendicular to the substrate.

5,073,434

IONOGRAPHIC IMAGING SYSTEM

John A. Frank, Webster; Joseph Mammino, Penfield; Dennis A. Abramsohm, Pittsford; Donald S. Sypula, Penfield; Jerome P. Chasko, Williamson; William L. Gary, Lyons; Deborah J. Nichol-Landry, Rochester; Fred W. Schmidlin, Pittsford, all of N.Y.; Dasarao K. Murti, Mississauga, Canada, and Brian E. Springett, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1989, Ser. No. 459,401

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—195 10 Claims

1. An ionographic imaging member comprising a conductive layer and at least one uniform continuous dielectric imaging layer free of voids comprising a film forming polymer, said imaging layer having a dielectric constant of between about 1.5 and about 40, a bulk resistivity of at least about 10^{10} ohm cm at a relative humidity between about 10 percent and about 80 percent at a temperature between about 16° C. and about 50° C., and a thickness of at least about 45 micrometers, said thickness divided by said dielectric constant having a value of between about 30 and about 60.

5,073,435

COMPOSITE POLYESTER FILMS

Marcel Eyraud, Lyons, and Pierre Grosjean, Sainte Foy Les Lyon, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Dec. 23, 1987, Ser. No. 137,160

Claims priority, application France, Dec. 23, 1986, 86 18231

Int. Cl.[5] B32B *7/02, 27/36;* B29C *47/88*

U.S. Cl. 428—215 23 Claims

1. A coextruded composite polyester film comprising a crystalline or semicrystalline polyester film substrate (A), said film substrate (A) having a coating (B) of an oxysulfonylated copolyester adhesion primer on at least one of the face surfaces thereof, and said oxysulfonylated copolyester comprising admisture of (a) a crystalline or semicrystalline polyester, and (b) an oxysulfonylated copolyester wherein the number of oxysulfonylated recurring units, relative to 100 recurring units of like monomer, ranges from 3 to 20, and the respective amounts of the components (a) and (b) are such that the number of oxysulfonylated recurring units in the mixture relative to the total number of recurring units of like monomer, ranges from 2 to 15%.

2. The composite polyeste film as defined by claim 1, having a total thickness of from 5 to 300 micrometers and wherein the thickness of said coating(s) (B) ranges from 0.3 to 10 micrometers.

5,073,436

MULTI-LAYER COMPOSITE NONWOVEN FABRICS

Paul N. Antonacci, Smyrna; Geraldine M. Eaton, Acworth; Delores R. Morris, Powder Springs, and William T. Tapp, Marietta, all of Ga., assignors to Amoco Corporation, Chicago, Ill.

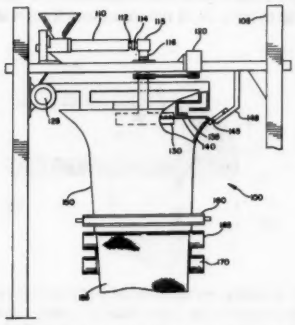
Continuation-in-part of Ser. No. 464,249, Jan. 12, 1990, abandoned, and Ser. No. 411,908, Sep. 25, 1989. This application Jul. 20, 1990, Ser. No. 556,354

Int. Cl.[5] B32B *5/06*

U.S. Cl. 428—219 21 Claims

1. A multi-layer composite nonwoven fabric having a basis weight in the range of about 0.5 to about 5.0 oz/yd^2 with water repellency and water vapor permeability properties comprising,

at least one layer of a uniform basis weight self-bonded web comprising a plurality of substantially randomly disposed, substantially continuous thermoplastic filaments wherein said web has a basis weight of about 0.1 oz/yd^2 or greater and a BWUI of 1.0±0.05 determined from average basis weights having standard deviations of less than 10%, and



at least one layer of a microfibrous web comprising a plurality of substantially totally discontinuous thermoplastic microfibers.

5,073,437

PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 22, 1989, Ser. No. 313,870

Claims priority, application Japan, Feb. 23, 1988, 63-40302

Int. Cl.[5] B32B *7/02;* C08L *23/00*

U.S. Cl. 428—220 4 Claims

1. A packaging material for photosensitive materials which comprises a light-shielding linear low density polyethylene resin film layer comprising 40 to 95 wt. % of linear very low density polyethylene resin having a density of 0.870 to 0.918 g/cm^3, a melt flow rate of 0.3 to 5 g/10 minutes and a Vicat softening point of lower than 99° C., 3 to 50 wt. % of polyethylene resin having a density of 0.930 to 0.965 g/cm^3, a melt flow rate of 0.4 to 5 g/10 minutes and a Vicat softening point of higher than 110° C., 0.1 to 15 wt. % of carbon black and 0.01 to 2 wt. % of antioxidant.

5,073,438

PROCESS FOR THE PREPARATION OF LAMINATES

Kurt Meier, Binningen; Theobald Haug, Frenkendorf, both of Switzerland, and Wolfgang Scharf, Grenzach-Wyhlen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 279,747, Dec. 5, 1988, Pat. No. 4,963,300. This application Aug. 23, 1990, Ser. No. 572,731

Claims priority, application Switzerland, Dec. 15, 1987, 4881/87

Int. Cl.[5] B29C *43/02, 43/20, 43/30*

U.S. Cl. 428—224 9 Claims

1. A laminate obtained from a process comprising

i) contacting a fibrous substrate with a curable mixture consisting essentially of at least one epoxy resin having on average at least two 1,2-epoxide groups per molecule and, as initiator, at least one compound of formula I

$$[R^1(Fe^{II}R^2)_a]^{ab\oplus}ab.[X]^{\ominus} \quad (I)$$

in which a and b are independently of one another 1 or 2, R^1 is a carbocyclic aromatic hydrocarbon having 6–24 carbons atoms which is unsubstituted or substituted one or more times with halogen, C_1–C_8alkyl, C_1–C_8alkoxy or phenyl; or R^1 is a heterocyclic aromatic hydrocarbon having 4–11 carbon atoms and 1 to 2 O or S atoms unsubstituted or substituted one or more times with halogen, C_1–C_8alkyl, C_1–C_8alkoxy or phenyl; R^2 is a carbocyclic aromatic hydrocarbon having 6–24 carbons atoms which is unsubstituted or substituted one or more times with halogen, C_1–C_8alkyl, C_1–C_8alkoxy or phenyl; or R^2 is a heterocyclic aromatic hydrocarbon having 4–11 carbon atoms and 1 to 2 O or S atoms unsubstituted or substituted one or more times with halogen, C_1–C_8alkyl, C_1–C_8alkoxy or phenyl; or R^2 is an indenyl or a cyclopentadienyl anion unsubstituted or substituted with C_1–C_8alkyl or C_1–C_8alkoxy; X^- is an anion of a partly fluorinated or perfluorinated aliphatic or aromatic sulfonic acid or an anion $[LQ_m]^-$ wherein L is P, As or Sb, and Q is fluorine or a mixture of fluorine and hydroxyl, m corresponds to a value which exceeds the valence of L by one;

ii) preparing a laminated sequence from at least two layered materials which are to be bonded together, at least one of which is a layer according to step i) wherein practically no preliminary crosslinking occurs;

iii) placing the laminated sequence in a compression mold;

iv) compression molding the laminated sequence wherein pressure and temperature are selected in such a way that a liquid matrix is present at the beginning of this step in which an initial fall in viscosity is produced so that entrained gases can escape from the laminated sequence; and

v) crosslinking the compression molded laminate sequence such that the rise in viscosity is carried out so quickly that the resin which flows out does not bind the compression mold.

5,073,439

MAGNETIC RECORDING MEDIUM COMPRISING A VINYL CHLORIDE BASED RESIN GROUP CONTAINING AN EPOXY GROUP OR A POLAR OR BOTH AND FURTHER A POLYURETHANE RESIN CONTAINING THREE HYDROXYL GROUPS AND ONE POLAR GROUP

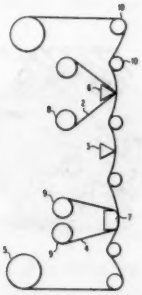
Hiroshi Hashimoto; Akira Ushimaru, and Yuuichirou Murayama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 8, 1990, Ser. No. 534,898

Claims priority, application Japan, Jun. 8, 1989, 1-146309

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—328 **7 Claims**



1. A magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer containing a ferromagnetic powder and a binder, said ferromagnetic powder having a crystalline size of 250 Å of less, said binder comprising a vinyl chloride based resin having a weight average molecular weight in the range of from 20,000 to 100,000 each molecule of which containing an epoxy group or at least one polar group in an amount of from 1×10^{-7} to 1×10^{-3} equivalent per gram of vinyl chloride based resin or both said at least one polar group selected from the group consisting of $-SO_3M$, $-OSO_3M$, $-PO_3M_2$, $-OPO_3M_2$, $-COOM$, $-NR_2$, and $-N^+R_3X^-$ wherein M represents a hydrogen atom or alkyl group, R may be the same or different and each represents a hydrogen atom or alkyl group, and X represents a halogen atom, said binder further comprising a polyurethane resin each molecule of which contains at least three hydroxyl groups and at least one of the polar group, and the surface of said magnetic layer having an ultramicrohardness of 40 $g/(\mu m)^2$ or more.

5,073,440

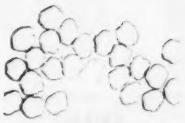
POLY(VINYL PYRROLIDONE)/P-PHENYLENE TEREPHTHALAMIDE COMPOSITE FIBERS (PVP/PPD-T)

Kiu-Seung Lee, Richmond, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 5, 1989, Ser. No. 361,411

Int. Cl.[5] D03D *3/00*; D02G *3/00*; B27N *9/00*; C08F *8/30*

U.S. Cl. 428—224 **3 Claims**



2. A continuous fiber consisting essentially of PPD-T and PVP wherein the PVP has a molecular weight of 10,000 to 360,000 and is present in the amount of from 3 to 30 percent, by weight, of the PPD-T, the filament tenacity of the fiber is greater than 15 grams per denier, the specific tenacity of the fiber is greater than 17 grams per denier, the cross sectional shape of the fiber is out-of-round, and the fiber exhibits greater adhesion to rubber than a fiber of the same weight and structure made from fibers from PPD-T alone.

5,073,441

MESH STRUCTURE WITH HIGH RESISTANCE TO PIERCING AND TEARING

Didier Melec, Chemin de La Tuilerie; Claudine You, Cité des Castors; Geneviéve Lefere, Montigny-Les-Metz, and Claudine Peres, Le Bouscat, all of France, assignors to Societe Civile D'Inventeurs SPML, France

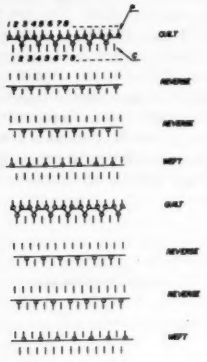
Continuation of Ser. No. 282,944, Dec. 6, 1988, abandoned, which is a continuation of Ser. No. 933,138, Nov. 21, 1986, abandoned. This application Feb. 14, 1990, Ser. No. 481,656

Int. Cl.[5] B32B *7/00*

U.S. Cl. 428—254 **7 Claims**

1. A novel mesh structure with high resistance in particular to piercing and tearing, characterized in that it comprises a knit fabric the texture of which is formed of an entirety of forward meshes comprising a quilting stitch, two cylindrical reverses

and a flat weft, repeated every eight drops, the threads forming the knit comprising polyaramide fibers.



2. The mesh of claim 1 further comprising a coating of a resin applied to at least one surface thereof.

5,073,442

METHOD OF ENHANCING THE SOIL- AND STAIN-RESISTANCE CHARACTERISTICS OF POLYAMIDE AND WOOL FABRICS, THE FABRICS SO TREATED, AND TREATING COMPOSITIONS

Barry R. Knowlton, Bramalea, and Yassin Elgarhy, St. Laurent, both of Canada, assignors to Trichromatic Carpet Inc., Quebec, Canada

Filed Nov. 8, 1989, Ser. No. 433,508
Int. Cl.[5] B32B *3/02;* B05D *3/02*
U.S. Cl. 428—267 14 Claims

1. The method of enhancing soil- and stain-resisting properties of polyamide and wool fabrics comprising applying to the fabric an aqueous solution containing the condensation product of formaldehyde with a compound selected from the group consisting of bis(hydroxyphenyl) sulfone, phenylsulfonic acid, dihydroxy diphenyl sulfone, and benzene sulfonic acid; and at least one material selected from the group consisting of a wax emulsion and a fluorochemical; and a polymer selected from the consisting of acrylic polymer and copolymer.

7. An aqueous solution for enhancing the soil- and stain-resistant properties of polyamide and wool fabrics comprising in admixture a condensation product of an aromatic sulfonic acid and formaldehyde together with wax emulsion, a nonionic water based fluorochemical, and an acrylic polymer, said admixture having a pH below 10.

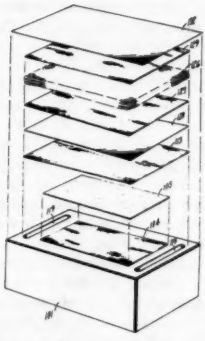
9. A fibrous material selected from the group consisting of polyamide and wool fibrous materials having applied thereto an aqueous solution containing a polymer of a phenolic compound selected from the group consisting of bis(hydroxyphenyl) sulfone, phenylsulfonic acid, dihydroxy diphenyl sulfone and benzene sulfonic acid with an aldehyde; a fluorochemical and an acrylic polymer together with citric acid in an amount sufficient to provide a pH below 7.

5,073,443

THERMAL BARRIER FOR HIGH TEMPERATURE MOLDING

Robert V. Kromrey, Campbell, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 138,738, Dec. 28, 1987, Pat. No. 4,983,345.
This application Dec. 23, 1988, Ser. No. 288,934
The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.
Int. Cl.[5] B32B *5/14, 5/16, 18/00*
U.S. Cl. 428—313.7 18 Claims



1. A thermal barrier layer particularly adapted for insulating a solid flowable particulate polymeric pressure transfer medium from elevated temperatures during high temperature molding comprising:

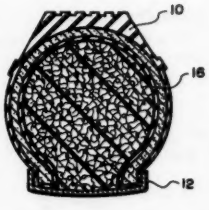
at least two flexible layers of beads having a thermal insulation of less than about 2 k.

5,073,444

MOLDED POLYPROPYLENE FOAM TIRE CORES

Dennis A. Shanelec, 1515 State St., Suite 1, Santa Barbara, Calif. 93101

Filed Jan. 11, 1990, Ser. No. 463,458
Int. Cl.[5] B32B *27/38;* C08J *9/24*
U.S. Cl. 428—313.5 4 Claims



1. A tire core for use in a vehicle tire casing, said tire core consisting of:

at least (one) two arcuate segments, formed prior to insertion into said casing, of molded polypropylene foam beads fused together by steam and shrunk so that, when said segments are inserted in said casing, said segments will expand and be held in compression by said casing.

5,073,445

MASTIC AND CAULKING COMPOSITIONS AND COMPOSITE ARTICLES

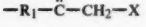
David M. Ingle, Temple City, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 903,779, Sep. 4, 1986, Pat. No. 4,855,349. This application Jun. 16, 1989, Ser. No. 367,462

Int. Cl.[5] B32B *13/12*

U.S. Cl. 428—314.4 21 Claims

1. A relatively inflexible, architectural substrate coated on at least a portion of one surface thereof with a mastic composition comprising at least about 15 weight percent of a water insoluble polymer and about 25 to about 85 weight percent water-insoluble solid matter other than said polymer of which about 5 to about 75 weight percent, based on total solids, is pigment, said polymer has a T_g of about $-50°$ C. to about $-10°$, is permanently flexible and non-tacky when cured, and comprises pendant functional groups attached to the polymer backbone having the formula:



in which R_1 is a divalent organic radical at least 3 atoms in length, X is —CO—R_4 or —CN, and R_4 is hydrogen or a monovalent organic radical, and wherein said polymer is selected from the group consisting of

(a) conjugated diolefin polymers comprising at least about 30 weight percent of one or more conjugated diene monomers having 4 to about 8 carbon atoms and 0 to about 70 weight percent of one or more alkenyl-substituted monoaromatic monomers;

(b) olefin-ester interpolymers comprising at least about 1 weight percent of a mono-olefin monomer having up to about 4 carbon atoms and at least about 40 weight percent of an alkenyl or alkenol ester of a saturated carboxylic acid;

(c) olefinically unsaturated carboxylic acid ester polymers comprising at least about 40 weight percent polymerized olefinically unsaturated carboxylic acid ester monomers;

(d) alkenyl ether polymers comprising at least about 30 weight percent alkenyl ether monomer units; and

(e) combinations thereof.

5,073,446

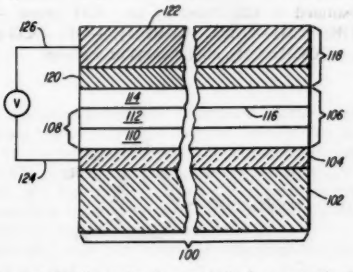
ORGANIC ELECTROLUMINESCENT DEVICE WITH STABILIZING FUSED METAL PARTICLE CATHODE

Michael Scozzafava; Ching W. Tang, both of Rochester, and Jon E. Littman, Honeoye Falls, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 26, 1990, Ser. No. 557,857

Int. Cl.[5] H01J *1/62*

U.S. Cl. 428—323 18 Claims



1. An organic electroluminescent device comprised of, in sequence, a support, an anode, an organic electroluminescent medium, and a cathode consisting essentially of a plurality of metals other than alkali metals, at least one of said metals having a work function less than that of indium,

characterized in that said cathode is comprised of a layer of fused metal particles containing at least 80 percent indium and having a mean diameter of less than 1 μm and a coefficient of variation of less than 20 percent.

5,073,447

POLYPROPYLENE-BASED RESIN COMPOSITION

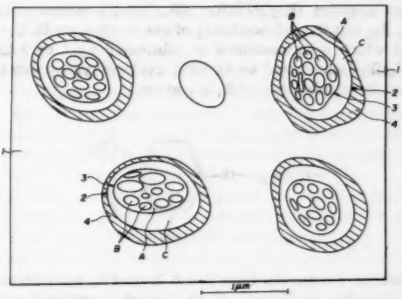
Hirohide Mizuno; Shinichi Koide; Manabu Nomura, all of Ichihara; Nobuya Kawamura, Toyota; Takeyoshi Nishio, Okazaki, and Takao Nomura, Toyota, all of Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Dec. 8, 1989, Ser. No. 448,068

Claims priority, application Japan, Dec. 27, 1988, 63-327796

Int. Cl.[5] B32B *5/16*

U.S. Cl. 428—327 20 Claims



1. A polypropylene-based composite resin composition which comprises:

(a) a matrix phase formed of a polypropylene resin;

(b) a particulate dispersed phase distributed in the matrix phase and formed of a rubber-reinforced styrene-based resin, the particles of the rubber-reinforced styrene-based resin having an area-average particle diameter not exceeding 5 μm and having such a structure that rubber particles of a "salami" structure having an area-average particle diameter of 0.5 to 1.5 μm are dispersed in the styrene-based resin; and

(c) a coating layer of a compatibility improver formed on the surface of the particles of the rubber-reinforced styrene-based resin and having a thickness of 0.05 to 0.5 μm.

5,073,448

RECORDING MATERIALS FOR INK-JET PRINTING

Eric Vieira, and Hugh S. Laver, both of Fribourg, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

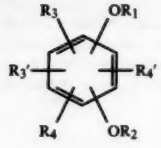
Filed Dec. 12, 1989, Ser. No. 450,135

Claims priority, application Switzerland, Dec. 14, 1988, 4623/88; Jun. 9, 1989, 2172/89

Int. Cl.[5] B41M *5/00*

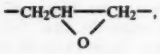
U.S. Cl. 428—331 13 Claims

1. A recording material for ink jet printing comprising a carrier having a surface which can be printed on or a carrier coated on one side with a material which can be printed on, wherein said carrier or said coating contains as a stabilizer, at least one compound of the formula I

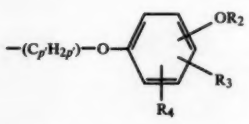


(I)

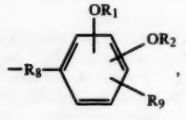
in which R_1 and R_2 independently of one another are C_1–C_4alkyl which is unsubstituted or substituted by one or two —OH, —$COO^{\ominus}M^{\oplus}$ and/or —$SO_3^{\ominus}M^{\oplus}$ groups, C_3–C_5alkenyl, C_3–C_5alkynyl,



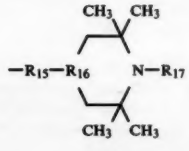
—$CH_2CH(OH)CH_2$—$SO_3^{\ominus}M^{\oplus}$, —CO-alkyl(C_1–C_4) which is unsubstituted or substituted by —$COOR^o$ or —CO—$N(R_5)(R_6)$ or, if OR_1 and OR_2 are in the ortho-position relative to one another, R_1 and R_2 together are C_1–C_6alkylene, $M^{\oplus}$ being $H^{\oplus}$, a monovalent, divalent or trivalent metal cation or a group $(R_{12}')N^{\oplus}(R_{12}'')(R_{13}')(R_{14}')$, wherein R_{12}', R_{12}'', R_{13} and R_{14} independently of one another are H, C_1–C_4alkyl which is unsubstituted or substituted by 1 or 3 OH, C_1–C_4alkyl interrupted by O, allyl, cyclopentyl, cyclohexyl, phenyl, benzyl or tolyl, or R_1 is a group



in which p' is a number from 2 to 6, R_5 and R_6 independently of one another are H or C_1–C_4alkyl which is unsubstituted or substituted by an OH, $COOR^o$, —$COO^{\ominus}M^{\oplus}$, SO_3R^o, $SO_3^{\ominus}M^{\oplus}$, $P(O)(O^{\ominus}M^{\oplus})_2$ or $P(O)(OR^o)_2$ group, R_3' and R_4' independently of one another are H, C_1–C_4alkyl, OH or C_1–C_4alkoxy, R_3 and R_4 independently of one another are H, halogen, —OR_7, —$COOR^o$, —$COO^{\ominus}M^{\oplus}$, —OOC—R_5, —CO—$N(R_5)(R_6)$, —$(R_5)N$—CO—R_6, —CO—R_5, —$SO_3^{\ominus}M^{\oplus}$, —$SO_2N(R_5)(R_6)$, —$P(OR_5)_3$, —$(O)P(O^{\ominus}M^{\oplus})_2$, —$(O)P$—$(OR^o)_2$, C_1–C_8alkyl which is unsubstituted or substituted by 1 to 7 —OR_5 or —OOC—R_5 groups, by 1 or 2 —$COOR^o$, —$COO^{\ominus}M^{\oplus}$, or —CO—$N(R_5)(R_6)$ groups or by one or two —$SO_3^{\ominus}M^{\oplus}$, —$SO_2N(R_5)(R_6)$ or —$(O)P$—$(OR^o)_2$ or —$(O)P(O^{\ominus}M^{\oplus})_2$ groups, where $M^{\oplus}$, R_5 and R_6 are as defined above, or C_5–C_6cycloalkyl or allyl, R^o being C_1–C_4alkyl which is unsubstituted or substituted by an —OH group or —$(CH_2CH_2O)_r$—H in which r is 1 to 12, and R_7 being C_1–C_4alkyl or —CO-alkyl(C_1–C_4) each of which is unsubstituted or substituted by 1 or 2 —OH groups or R_3 and R_4 independently of one another are one of the groups of the formulae II–IV

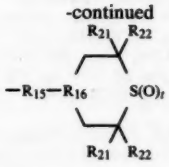


(II)



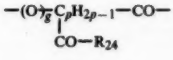
(III)

-continued

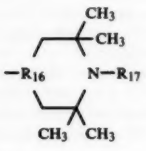


(IV)

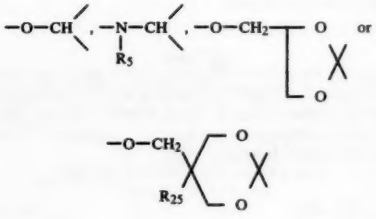
in which R_8 is a direct bond or methylene, R_9 is H, C_1–C_8alkyl, —$COO^{\ominus}M^{\oplus}$ or —$SO_3^{\ominus}M^{\oplus}$, where $M^{\oplus}$, R_1 and R_2 are as defined above, R_{15} is —CO—, —$(O)_g$—C_pH_{2p}—CO—, —OOC—C_pH_{2p}—, —COO—C_pH_{2p}—, —O—$CH_2CH(OH)$—CH_2— or



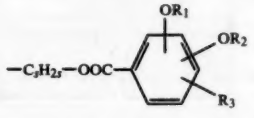
in which g is 0 or 1 and p is 1 to 6 and R_{24} is —OR_5, —$N(R_5)(R_6)$ or a group



and R_{16} is one of the following radicals:



in which R_{25} is H or C_1–C_4alkyl, R_{17} is H, C_1–C_4alkyl which is unsubstituted or substituted by an —OH group, —CH-2—CH(OH)—CH_2—OH, C_1–C_4-alkoxy, —OH, —CO-alkyl(-C_1–C_4), —COCH=CH_2, allyl, benzyl or a group



in which s is the number 2 or 3, t is a number from 0 to 2 and R_{21} and R_{22} independently of one another are H, C_1–C_4alkyl or phenyl.

5,073,449

MAGNETIC RECORDING MEDIUM AND METHOD FOR PRODUCING THE SAME

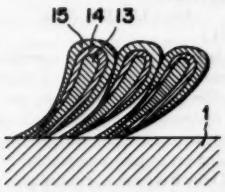
Hideaki Niimi; Noboru Isoe, both of Toride; Kunio Wakai, Ibaraki, and Tetsuo Mizamura, Toride, all of Japan, assignors to Hitachi Maxell Ltd., Osaka, Japan

Continuation of Ser. No. 851,464, Apr. 14, 1986, abandoned. This application Mar. 21, 1988, Ser. No. 171,174

Claims priority, application Japan, Apr. 15, 1985, 60-78562

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—336 18 Claims



1. A magnetic recording medium comprising:

a substrate;

a ferromagnetic metal layer formed on said substrate; and

an outer skin layer which is formed on said ferromagnetic metal layer, said outer skin layer comprising a hydrated amorphous cobalt oxide, the X-ray photoelectron spectra of which is characterized in that, in the CO_{2p} spectrum, a ratio of a peak height at 785.9±0.3 eV to that at 780.0±0.3 eV is 40/100 or less when a background (BG) line is drawn between the lower energy side leading edge points of peaks at 780.0±0.3 eV ($2p_{3/2}$) and 795.6±0.3 eV ($2p_{1/2}$) and, in the O_{1s} spectrum, a ratio of a peak height at 529.3±0.4 eV to that at 530.8±0.4 eV is from 100:110 to 100:50 when a background line is drawn between the lower energy side leading edge point and the higher energy side leading edge point of a complex peak at 530.5±2.5 eV which is separated into two component peaks at 529.3±0.4 eV and 530.8±0.4.

5,073,450

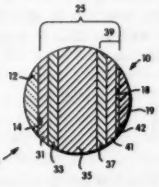
LAMINATED GLAZING UNIT

Kenneth E. Nietering, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 17, 1990, Ser. No. 628,293

Int. Cl.[5] B32B *17/06*

U.S. Cl. 428—336 11 Claims



1. A laminated glazing unit comprising a substrate ply and a laminating ply of polymeric material, having a surface laminated to a substrate ply surface, a substantially transparent, electrically conductive coating on the substrate ply surface comprising a film stack wherein a film of electrically conductive material is covered by a first film of dielectric material, the first film of dielectric material comprising:

a layer of silicon dioxide immediately adjacent the laminating ply; and

a layer of dielectric material of refractive index greater than about 1.5 between the layer. of silicon dioxide and the film of electrically conductive material.

5,073,451

HEAT INSULATING GLASS WITH DIELECTRIC MULTILAYER COATING

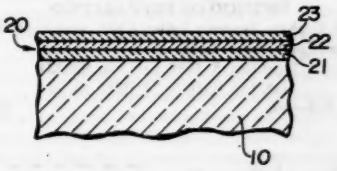
Yasunobu Iida, Matsusaka; Nobuyuki Takeuchi, Ise; Masato Nakamura, Mie; Koichi Furuya; Hiroshi Nakashima, both of Matsusaka, and Toshiaki Itoh, Tsu, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jul. 31, 1990, Ser. No. 560,816

Claims priority, application Japan, Jul. 31, 1989, 1-198304; Feb. 16, 1990, 2-35298

Int. Cl.[5] G02B *5/22;* B32B *17/06*

U.S. Cl. 428—336 12 Claims



1. A heat insulating glass plate particularly suitable as a vehicle window glass, having a transparent glass plate and a multilayer coating formed on one side of the glass plate, the multilayer coating comprising:

a first layer which is a transparent and dielectric film of a aluminum nitride having a refractive index in the range from 1.8 to 2.1 deposited on a surface of the glass plate;

a second layer which is a transparent and dielectric film of a titanium oxide having a refractive index in the range from 2.2 to 2.5 deposited on said first layer; and

a third layer which is a transparent and dielectric film of a aluminum nitride having a refractive index in the range from 1.8 to 2.1 deposited on said second layer;

each of said first, second and third layers being formed by a sputtering process or a chemical vapor deposition process and having a thickness in the range from 100 to 2000 Å and a surface resistivity not lower than 10 kΩ/□, the multilayer coating being formed such that the heat insulating glass plate is not lower than 65% in transmittance for the visible light, not higher than 15% in reflectance for the visible light and not higher than 65% in transmittance for solar radiation and such that the heat insulating glass plate is lower than the glass plate itself in transmittance for solar radiation by at least 5%.

5,073,452

FILM FOR PRINT LAMINATION

Junya Satou, Shiga; Masatsugi Murakami, Moriyama, and Kikuji Sasaki, Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed May 9, 1990, Ser. No. 520,749

Claims priority, application Japan, May 9, 1989, 1-116609

Int. Cl.[5] B32B *7/12, 27/08*

U.S. Cl. 428—349 23 Claims

1. A film for print lamination which comprises a biaxially drawn polypropylene film having a heat-adhesive layer provided on one side thereof, the surface of said heat-adhesive layer having a wet tension of not smaller than 34 dyne/cm, said heat-adhesive layer being comprised of a composition comprising:

(a) 100 parts by weight of a first component consisting of an ethylene-methyl methacrylate copolymer having a melt flow rate of from 5 to 500; and

(b) from 5 to 50 parts by weight of a second component having a melt flow-rate of from 0.05 to 3.0 selected from the group consisting of polyethylene and an ethylene-methyl methacrylate copolymer, wherein said heat-adhesive layer has a surface roughness Ra of not less than 0.2 μm and a surface roughness Rt of not less than 1.5 μm.

5,073,453
HIGH TENACITY NYLON YARN

Raymond S. Knorr, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

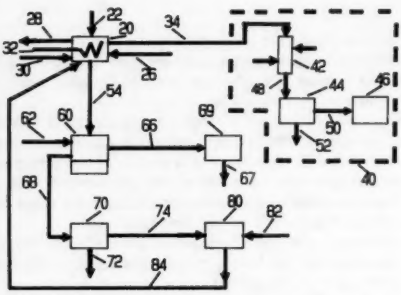
Filed Dec. 18, 1989, Ser. No. 452,084
Int. Cl.[5] D02G *3/00*
U.S. Cl. 428—373 **7 Claims**

1. An undrawn solid-state polymerized as-spun nylon yarn characterized in that said nylon has a Mw of at least 70,000 and displays two cyrstalline endotherms by DSC analysis.

5,073,454
OXIDATION RESISTANT ACTIVATED CARBON AND METHOD OF PREPARATION

James R. Graham, Fountain Valley, Calif., assignor to Westates Carbon, Los Angeles, Calif.

Filed Sep. 5, 1989, Ser. No. 403,234
Int. Cl.[5] B32B *9/04*; B01J *20/30*
U.S. Cl. 428—403 **48 Claims**



26. A process for increasing the oxidation resistance of granular activated carbon comprising:

coating an effective portion of the surface of granular activated carbon with an intumescent material thereby forming coated granular activated carbon,

the effective portion of the surface of the granular activated carbon being sufficient for increasing the oxidation resistance of the granular activated carbon when it is subjected to a predetermined elevated temperature, and

the effective portion of the surface of the granular activated carbon being insufficient for causing a detrimental reduction in the adsorption capacity of the granular activated carbon when the coated granular activated carbon is at temperatures below the predetermined elevated temperature,

heating the thus-coated granular carbon, which has become spent by an adsorbed contaminant, to a predetermined high temperature operable for removing the adsorbed contaminant therefrom and expanding the intumescent material thereby reforming granular activated carbon;

removing and separating the intumescent material from the reformed granular activated carbon thereby producing separated reformed activated granular carbon; and

coating an effective portion of the surface of the separated reformed granular activated carbon with an effective amount of intumescent material thereby forming recoated granular activated carbon,

the effective portion of the surface of the recoated granular activated carbon being sufficient for increasing the oxidation resistance thereof when subjected to the predetermined elevated temperature, and

the effective portion of the surface of the recoated granular activated carbon being insufficient for causing a detrimental reduction in the adsorption capacity of the granular activated carbon when the granular activated carbon is at a temperature below the predetermined elevated temperature.

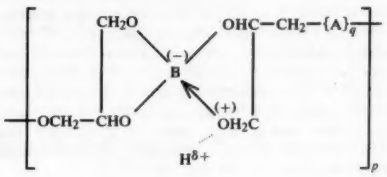
5,073,455
THERMOPLASTIC LAMINATED FILM

Katsuhiko Nose; Katsuaki Kuze, and Hideaki Tatsuta, all of Fukui, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka and Kabushiki Kaisha Boron International, Tokyo, both of, Japan

Filed Jan. 26, 1989, Ser. No. 302,752
Claims priority, application Japan, Jan. 26, 1988, 63-15091; Jul. 29, 1988, 63-190965
Int. Cl.[5] B32B *27/00*
U.S. Cl. 428—411.1 **8 Claims**

1. A thermoplastic laminated film comprising a base film made of thermoplastic resin and a layer formed on at least one side of said base film sufficient to increase the adhesiveness of said base film to hydrophilic polymers, hydrophobic polymers and inorganic substances, wherein said layer is made of a composition comprising (a) at least one natural or synthetic film-forming material which is soluble, emulsifiable or dispersible in water and (b) an organic boron polymer or a mixture composed of about 5:95 to about 95:5 by weight of an organic boron polymer and vinyl alcohol polymer, wherein said vinyl alcohol polymer is equivalent to polyvinyl alcohol with a degree of saponification of at least 70% and a degree of polymerization of at least 100, said organic boron polymer being at least one of the polymers having a repeating unit I or II:

(I)



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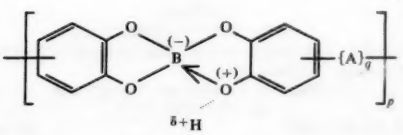
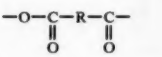
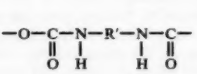


wherein p is 10 to 10,000; q is 0 or 1; and when q is 1, A is $-(X)_l-(Y)_m-(Z)_n-$, wherein X and Z are independently hydrocarbon groups with an ether linkage and containing 100 carbon atoms or less; Y is



wherein R is a hydrocarbon group containing 1 to 34 carbon atoms, or



wherein

R′ is a hydrocarbon group containing 2 to 13 carbon atoms, and

l, m, and n are independently 0 or 1,

wherein the relative proportion by weight of (a) to (b) is about 95:5 to about 5:95.

5,073,456

MULTILAYER PRINTED CIRCUIT BOARD FORMATION

John V. Palladino, Paulsboro, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 5, 1989, Ser. No. 446,335
Int. Cl.[5] B32B 9/00
U.S. Cl. 428—446 21 Claims

1. A process for forming a multilayer printed circuit board containing conductive through-holes which make electrical connections to a series of electrically conducting layers through several insulating layers comprising the steps of:

(a) forming electrically conductive copper circuitry on a surface of a dielectric layer support with the circuitry having a thickness of at least 4 microns;

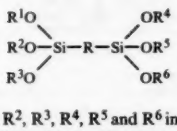
(b) forming on the copper circuitry a layer of an oxide, hydroxide or combination thereof of tin by application of tin to the copper circuitry whereby during application or subsequent thereto the applied tin is converted on its surface to the oxide, hydroxide or combination thereof with the proviso that the layer of oxide, hydroxide or combination is not greater than 1.5 mils in thickness;

(c) applying a silane bonding mixture to the surface of the oxide, hydroxide or combination thereof formed in step (b) or an insulating layer to be bonded to the copper circuitry to form an adherent organosilane coating thereon, the insulating layer comprising a partially cured thermosetting polymer composition and the silane bonding mixture consisting essentially of:

(I) a ureido silane having the structure

wherein A is an alkylene having 1 to 8 carbon atoms, B is a hydroxy or an alkoxy having 1 to 8 carbon atoms and n is an integer of 1, 2, or 3 with the proviso that if n is 1 or 2, each B need not be identical; and

(II) a disylyl crosslinking agent having the structure



wherein R^1, R^2, R^3, R^4, R^5 and R^6 independently of the other is an alkyl with 1 to 8 carbon atoms and where R denotes an alkylene group having 1 to 8 carbon atoms;

(d) repeating steps (a), (b) and (c);

(e) bonding materials formed by steps (a), (b), (c) and (d) into a single article whereby an organosilane coating is between a layer of the oxide, hydroxide or combination and an insulating layer whereby during bonding the partially cured insulating layer is cured;

(f) forming a number of holes through the bonded article formed in step (e);

(g) metallizing walls of the through-hole to form electrically conductive paths from opposite openings of the through-hole to form a multilayer circuit board with the proviso that the multilayer printed circuit board will not delaminate upon exposure to thermal stress at 550° F. for 10 seconds after baking at 250° F. for 6 hours and then preconditioning at 85° C. and 85% relative humidity for twenty-four (24) hours.

5,073,457

REPOSITIONABLE ADHESIVE

Elmer Blackwell, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 272,878, Nov. 21, 1988, abandoned. This application May 17, 1990, Ser. No. 525,441
Claims priority, application Taiwan, Dec. 1, 1988, 77-108406
Int. Cl.[5] B32B 23/04
U.S. Cl. 428—484 12 Claims

1. A pressure-sensitive adhesive composition comprising:

a) from about 70 parts to about 98 parts of an acrylic copolymer of monomers containing:

(i) from about 60 to about 99 parts of an alkyl acrylate ester monomer, the alkyl groups of which have an average of 4 to 12 carbon atoms; and

(ii) from about 1 part to about 40 parts of a monoethylenically unsaturated polar copolymerizable monomer, and

b) about 0.3 percent to about 7 percent petroleum wax selected from the group consisting of paraffin wax, polypropylene emulsions and polyethylene emulsions to impart repositionable properties to said adhesive, said adhesive also exhibiting latent permanent adhesive properties after contacting a substrate from about 60 minutes to about 120 minutes.

5,073,458

POLYPROPYLENE-POLYBUTYLENE LAMINATED PACKAGING FILM WITH IMPROVED TEAR STRENGTH

Charles C. Hwo, Sugar Land, Tex., and Larry K. Watkins, Altamont, Ill., assignors to Shell Oil Company, Houston, Tex.

Filed May 31, 1990, Ser. No. 531,206
Int. Cl.[5] B32B 27/00
U.S. Cl. 428—516 1 Claim

1. A multiple-layer, heat-sealable laminated film comprising:

(a) a core layer formed from a member of the group consisting of butene-1 homopolymers and copolymers of butene-1 with ethylene wherein the ethylene content is 0.25% to 15% by weight, and

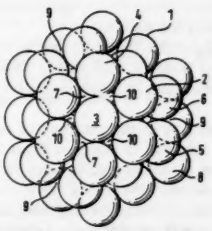
(b) on both sides of said core, a layer which is consisting essentially of a homopolymer or copolymer of propylene.

5,073,459

SINTERED LIGHT-WEIGHT STRUCTURAL MATERIAL AND METHOD OF ITS MANUFACTURE

Wilfried Smarsly, Munich, and Wolfgang Track, Alling, both of Fed. Rep. of Germany, assignors to MTU Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Jan. 24, 1990, Ser. No. 469,781
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902032
Int. Cl.[5] G22F 3/10
U.S. Cl. 428—550 15 Claims



1. A sintered metallic light-weight structural material, comprising a lattice structure of webs of intermetallic compounds forming equally spaced spherical voids which in turn are arranged in a maximally dense sphere packing configuration, the

interstices between said spherical voids being completely filled with the intermetallic compounds.

5,073,460

MAGNETIC RECORDING MEDIUM AND PROCESS FOR PRODUCING THE SAME

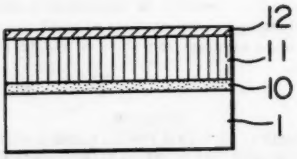
Masaaki Futamoto, Kanagawa; Yukio Honda, Fuchu; Selichi Asada, Kyoto; Takashi Nishimura, Kokubunji, and Kazuetsu Yoshida, Kodaira, Heigo Ishihara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell, Ltd., Osaka, both of Japan

Continuation of Ser. No. 149,142, Jan. 27, 1988, abandoned, which is a continuation of Ser. No. 789,824, Oct. 21, 1985, abandoned. Published Application No.

Claims priority, application Japan, Oct. 22, 1984, 59-221688; Mar. 20, 1985, 60-54419

Int. Cl.[5] G11B *5/66;* **G32B** *9/00*

U.S. Cl. 428—694 **37 Claims**



1. A magnetic recording medium comprising a substrate, a ferromagnetic thin film formed on substrate, a protective film formed directly on the ferromagnetic thin film, and a lubricant layer made of an organic material on said protective film, said ferromagnetic thin film and said protective film being formed continuously without said ferromagnetic thin film and said protective film to air and while maintaining said ferromagnetic thin film and said protective film in a vacuum, said protective film having two layers, the first layer being made of the element Si, Ge or B, a compound of Si, Ge or B, or an alloy principally made of Si, Ge, or B and the second layer being made of the element Sn, Pb, In, Se, Te, Cu, Ag or Au, a Sn-based alloy, a Te-based alloy, a Cu-based alloy, an Ag-based alloy or an Au-based alloy.

5,073,461

TRIBOCHEMICAL METHOD OF PRODUCING AN OXIDIZED SURFACE ON A CERAMIC OR METAL-CERAMIC

Benjamin M. DeKoven, and Patrick L. Hagans, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 27, 1989, Ser. No. 441,851

Int. Cl.[5] B32B *9/00, 19/00;* **B05D** *3/00;* **B23K** *1/20*

U.S. Cl. 428—698 **13 Claims**

1. A tribochemical method for producing oxidized surfaces on opposed surfaces of ceramic or metal-ceramic articles, said method comprising the steps of:

A. compressing under high vacuum at room temperature said opposed surfaces with sliding movement of one of said surfaces against an opposed said surface and, thereafter,

B. repeating step A in the presence of air or oxygen at a pressure of about 10 to less than about 10,000 pascal.

7. Ceramic or metal-ceramic articles having an oxidized surface on at least one articulating surface with a second ceramic or metal-ceramic surface comprising an oxidized, articulated ceramic or metal-ceramic surface obtained by the process of claim **1**.

10. Welded ceramic or metal-ceramic articles comprising ceramic of metal-ceramic welded surfaces obtained by the process of claim **1**.

5,073,462

PHOTOPOLYMERIZABLE COMPOSITION HAVING SUPERIOR ADHESION, ARTICLES AND PROCESSES

Joseph E. Gervay, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 262,267, Oct. 20, 1988, Pat. No. 4,937,172, which is a continuation of Ser. No. 936,880, Dec. 2, 1986, abandoned. This application Apr. 9, 1990, Ser. No. 509,415

Int. Cl.[5] G03F *7/033, 7/09;* **B32B** *3/00, 15/08*

U.S. Cl. 430—14 **3 Claims**

1. A Multilayer printed circuit board comprising two conductive layers separated by a dielectric layer of a photopolymerized composition formed from a precursor photopolymerizable composition which comprises

(a) a monomeric component which is a half acryloyl ester of bisphenol A epoxy monomer;

(b) an initiating system activated by actinic radiation; and

(c) a preformed macromolecular elastomeric water-insoluble polymer binder having substantially no acidic groups; with the proviso that after exposure of the photopolymerizable composition to actinic radiation a resulting photopolymerized composition has the ability to withstand contact without dissolution for 24 hours with a liquid at a pH 12 maintained at a temperature of 70° C. and with the further proviso that after lamination of the photopolymerizable composition onto a glass-epoxy substrate and upon exposure of actinic radiation and curing at a temperature of 150° C. the resulting photopolymerized composition can withstand a peel force of at least 5.0 pounds per linear inch without removal of the exposed and cured photopolymerized composition from the substrate.

5,073,463

METHOD OF MANUFACTURING A PHOSPHOR SCREEN FOR CATHODE RAY TUBES

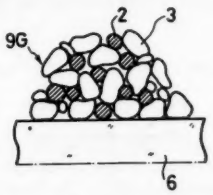
Koji Fujita, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,245

Claims priority, application Japan, Sep. 29, 1988, 63-245502

Int. Cl.[5] G03C *5/00*

U.S. Cl. 430—28 **1 Claim**



1. A method of manufacturing a phosphor screen for a cathode ray tube comprising the steps of:

(a) preparing a suspension by suspending phosphor particles and resin particles into an aqueous solution containing a photosensitive resin, a dispersing agent and a binder, said resin particles having an average particle size in a range of from over 2.0 to 12 micrometers, said resin particles being made of a resin selected from a group consisting of polyethylene and polystyrene;

(b) coating an inner surface of a cathode ray tube panel with a layer of said suspension to form a phosphor layer;

(c) drying the phosphor layer and then exposing the phosphor layer to light through an optical mask to form an exposed layer containing exposed portions and unexposed portions;

(d) developing the exposed layer by removing the unexposed portion with water to form a phosphor pattern;

(e) forming an intermediate layer of acrylic resin on said phosphor pattern;

(f) forming a metal back later on said intermediate film; and then

(g) baking the product to remove said intermediate layer and resin particles and to provide a spacing between the phosphor particles.

5,073,464

METHOD OF PROCESSING ELECTROPHOTOGRAPHIC LITHOGRAPHIC PRINTING PLATE PRECURSORS

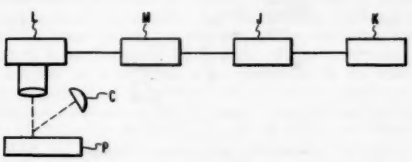
Sadao Osawa, and Hisao Ohba, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 2, 1989, Ser. No. 416,091

Claims priority, application Japan, Oct. 3, 1988, 63-247540

Int. Cl.[5] G03C 5/00

U.S. Cl. 430—30 7 Claims



1. A method for processing an electrophotographic lithographic printing plate precursor comprising a photoconductive layer provided on a conductive substrate, said photoconductive layer having a toner image formed thereon by an electrophotographic process, comprising measuring electronically the area of the nonimage area to be processed, treating said precursor with a processing fluid to remove the nonimage area of the photoconductive layer, and adding replenisher by automatic means in accordance with the area of the measured nonimage area.

5,073,465

ELECTROPHOTOGRAPHIC PHOTORECEPTOR COMPRISING A TRISAZO CHARGE GENERATING COMPOUND

Naonori Makino; Satoshi Hoshi; Shigeru Ohno, and Katsuji Kitatani, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

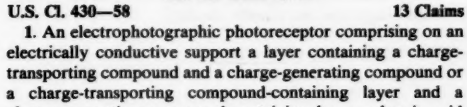
Filed May 18, 1990, Ser. No. 524,955

Claims priority, application Japan, May 18, 1989, 1-125383; May 19, 1989, 1-126282

Int. Cl.[5] G03G 5/06

U.S. Cl. 430—58 13 Claims

1. An electrophotographic photoreceptor comprising on an electrically conductive support a layer containing a charge-transporting compound and a charge-generating compound or a charge-transporting compound-containing layer and a charge-generating compound-containing layer, wherein said charge-generating compound is a trisazo compound represented by formula (1):



wherein Ar_1, Ar_2, Ar_3, Ar_4, Ar_5 and Ar_6 each represents an arylene group, divalent condensed polycyclic aromatic group or divalent group derived from a monocyclic or condensed polycyclic heterocyclic aromatic group, each of which may have one or more substituents; C_p represents a coupler residual group; and n represents 0 or 1.

5,073,466

ELECTROPHOTOGRAPHIC MEMBER CONTAINING A FLUORINE-CONTAINING LUBRICATING AGENT AND PROCESS FOR PRODUCING THE SAME

Fuminori Ishikawa, Hitachi; Kunihiro Tamahashi, Mito; Shigeharu Onuma; Masatoshi Wakagi, both of Hitachi; Masanobu Hanazono, Mito; Mitsuyoshi Shoji, Ibaraki; Takayuki Nakakawaji, Hitachi; Yutaka Ito, Takahagi; Shigeki Komatsuzaki, Mito; Yasuo Shimamura, and Chiaki Yamagishi, both of Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Chemical Company, Ltd., both of Tokyo, Japan

Filed Aug. 16, 1989, Ser. No. 394,657

Claims priority, application Japan, Aug. 29, 1988, 63-212582; Oct. 13, 1988, 63-255989; Jan. 13, 1989, 1-4950

Int. Cl.[5] G03G 5/14

U.S. Cl. 430—66 29 Claims

1. An electrophotographic member comprising a support, a photoconductive layer made of a hydrogenated amorphous silicon-containing material formed on the support, and a surface layer formed on the photoconductive layer, said surface layer comprising a lubricating agent having a perfluoropolyoxyalkyl group or a perfluoropolyoxyalkylene group containing 20 or more carbon atoms to form an organic surface protective lubricating layer and a fixing group for fixing the surface layer to the photoconductive layer.

5,073,467

ELECTROPHOTOGRAPHIC PHOTORECEPTOR

Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 11, 1989, Ser. No. 420,505

Claims priority, application Japan, Oct. 12, 1988, 63-254786; Nov. 17, 1988, 63-288973

Int. Cl.[5] G03G 5/087

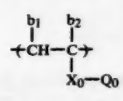
U.S. Cl. 430—87 11 Claims

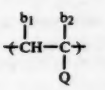
1. An electrophotographic photoreceptor comprising a support having provided thereon at least one photoconductive layer containing at least inorganic photoconductive particles and a binder resin, wherein the binder resin comprises:

(A) at least one resin having a weight average molecular weight of from 1×10^3 to 2×10^4 with at least one substituent selected from the group consisting of (i) $—PO_3H_2$, (ii) $—SO_3H$, (iii) —COOH, (iv)

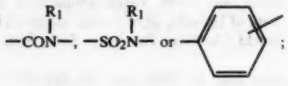
wherein R is a hydrocarbon group or —OR', and R' represents a hydrocarbon group, (v) —SH, (vi) a phenolic hydroxyl group, and (vii) a cyclic acid anhydride-containing group, the substituent being bonded to one of the terminals of the main chain thereof, Resin (A) containing from 0.5 to 15% by weight of acidic groups, and

(B) at least one comb type copolymer resin comprising a monofunctional macromonomer and a monomer, said monofunctional macromonomer having a weight average molecular weight of not more than 2×10^4, said macromonomer containing at least one polymerization component represented by formula (b-2) or (b-3):





wherein W_0 is —COO—, —OCO—, —CH_2OCO—, —CH_2COO—, —O—, —SO_2— —CO—,



wherein R_1 is a hydrogen atom or a hydrocarbon group; Q_0 is an aliphatic group having 1 to 18 carbon atoms or an aromatic group having from 6 to 12 carbon atoms; b_1 and b_2, which may be the same or different, each is a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group, or —COO—Z or —COO—Z bonded via a hydrocarbon group, wherein Z is a hydrogen atom or a substituted or unsubstituted hydrocarbon group; and Q is —CN, —$CONH_2$ or

wherein Y is a hydrogen atom, a halogen atom, an akoxyl group or —COOZ′, wherein Z′ is an alkyl group, an aralkyl group or an aryl group, with a polymerizable double bond-containing group represented by formula (b-1) being bonded to only one of the terminals of the main chain thereof:

(b-1)

wherein V has the same meaning as X_0; and a_1 and a_2, which may be the same or different, each has the same meaning as b_1 and b_2, and said monomer is represented by formula (b-4):

(b-4)

wherein X_1 has the same meaning as X_0; Q_1 has the same meaning as Q_0; and c_1 and c_2, which may be the same or different, each has the same meaning as b_1 and b_2.

11. An electrophotographic photoreceptor as claimed in claim **1**, wherein said photoconductive particles are zinc oxide particles.

5,073,468

METHOD OF FORMING ELECTROPHOTOGRAPHIC IMAGE

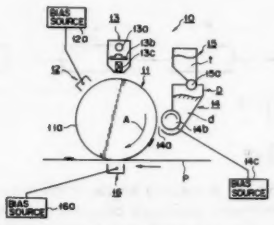
Tadao Yamamoto, Tokyo; Tetsuya Abe, Tama; Masaaki Dohi, Chofu; Shinichi Hisatomi, Higashimurayama; Mitsugu Oishi, Kodaira; Toshiro Honda, Mitaka; Mitsuo Hayashi, Hamura, and Takeo Hirono, Akishima, all of Japan, assignors to Casio Computer Co., Ltd. and Casio Electronics Manufacturing Co., Ltd., both of Tokyo, Japan

Filed Jun. 5, 1989, Ser. No. 361,594

Claims priority, application Japan, Jun. 10, 1988, 63-143116; Sep. 19, 1988, 63-234467; Sep. 27, 1988, 63-241681; Oct. 18, 1988, 63-262620; Oct. 18, 1988, 63-262621; Oct. 28, 1988, 63-272729; Oct. 28, 1988, 63-272730; Oct. 28, 1988, 63-272731; Dec. 9, 1988, 63-311352

Int. Cl.[5] **G03G** *9/00, 21/00*

U.S. Cl. 430—110 **4 Claims**



1. A method of forming an image without cleaning on the basis of repeated electrophotographic process cycles, each process cycle including the steps of:

charging a surface of a photosensitive body to a predetermined polarity;

irradiating the charged surface of the photosensitive body with light which carries image information, thereby forming a latent image corresponding to the image information;

visualizing the latent image using a dry developer material; and

transferring the visualized image from the surface of the photosensitive body to a transfer medium,

wherein the developer material contains a toner, and also a transfer accelerator comprising a light-transmitting powder composed of first and second fine powders which have opposite frictional charging polarities and each of which has an average particle size smaller than that of the toner, both said first and second fine powders consisting essentially of an acrylic polymer, said light-transmitting fine powder improving efficiency of transfer of the visualized image onto the transfer medium.

5,073,469

TONER COMPOSITIONS

Arthur F. Diaz, and Daphne L. Wollmann, both of San Jose, Calif., assignors to Lexmark International, Inc., Greenwich, Conn.

Filed Aug. 9, 1990, Ser. No. 565,286

Int. Cl.[5] **G03G** *9/097*

U.S. Cl. 430—110 **17 Claims**

1. A toner for developing latent electrostatic images comprising:

(a) about 88 to about 98.5 weight % of a binder copolymer comprising styrene and an acrylate ester; and

(b) about 0.1 to about 5 weight % of a negatively chargeable copolymer comprising sulfonated styrene and acrylate ester, each copolymer independently having a molecular weight from about 60,000 to about 120,000.

5,073,470

LIQUID DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY

Eiichi Kato, and Hideyuki Hattori, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

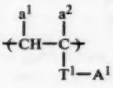
Filed Jan. 18, 1990, Ser. No. 466,811

Claims priority, application Japan, Jan. 18, 1989, 1-007712; Oct. 30, 1989, 1-279966

Int. Cl.[5] G03G 9/12

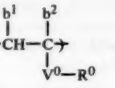
U.S. Cl. 430—114 **8 Claims**

1. A liquid developer for electrostatic photography comprising resin grains dispersed in a non-aqueous solvent having an electric resistance of at least 10^9 cm and a dielectric constant of not higher than 3.5, wherein the dispersed resin grains are grains of a copolymer obtained by polymerizing a solution containing at least one monofunctional monomer (A) which is soluble in the aforesaid non-aqueous solvent, but becomes insoluble after being polymerized and at least one monofunctional macromonomer (M) having a number average molecular weight of not more than 1×10^4 and having a polymerizable double bond group represented by the following formula (M-II) bonded to only one terminal of a polymer main chain composed of a recurring unit represented by the following formula (M-I) in the presence of a dispersion stabilizing resin which is a polymer having at least a recurring unit represented by the following formula (I), a part of which has been crosslinked, and has a polymerizable double bond group copolymerizable with the monofunctional monomer (A) bonded to only one terminal of at least one polymer main chain thereof, said dispersion stabilizing resin being soluble in the non-aqueous solvent;



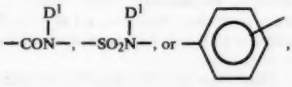
(I)

wherein T^1 represents —COO—, —OCO—, —CH^2OCO—, —CH_2COO—, —O—, or —SO_2—; A^1 represents an aliphatic group having from 6 to 32 carbon atoms; and a^1 and a^2, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group having from 1 to 8 carbon atoms, —COO—Z^1, or —COO—Z^1 bonded via a hydrocarbon group having from 1 to 8 carbon atoms (wherein Z^1 represents a hydrogen atom or a hydrocarbon group having from 1 to 18 carbon atoms);

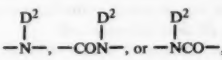


(M-I)

wherein V^0 represents —COO—, —OCO—, —$(CH_2)_l$COO—, —$(CH_2)_l$ OCO—, —O—, —SO_2—, —CONHCOO—, —CONHCONH—,



(wherein D^1 represents a hydrogen atom or a hydrocarbon group having from 1 to 22 carbon atoms and l represents an integer of from 1 to 3); R^o represents a hydrocarbon group having from 1 to 22 carbon atoms, said R^o may, however, contain —O—, —CO—, —CO_2—, —OCO—, —SO_2—,



wherein D^2 has the same significance as D^1, in the carbon chain; and b^1 and b^2, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group having from 1 to 8 carbon atoms, —$COOD^3$, or —COO—D^3 bonded via a hydrocarbon group having from 1 to 8 carbon atoms wherein D^3 represents a hydrogen atom or a hydrocarbon group having from 1 to 8 carbon atoms which may be substituted;

(M-II)

wherein V^1 has the same significance as V^o of formula (M-I) and c^1 and c^2, which may be the same or different, have the same meaning as b^1 and b^2 of formula (M-I).

5,073,471

LIQUID DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY

Eiichi Kato, and Hideyuki Hattori, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 7, 1990, Ser. No. 476,190

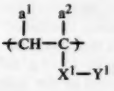
Claims priority, application Japan, Feb. 8, 1989, 1-27628; Oct. 31, 1989, 1-282026

Int. Cl.[5] G03G 9/13

U.S. Cl. 430—114 **9 Claims**

1. A liquid developer for electrostatic photography comprising resin grains dispersed in a non-aqueous solvent having an electric resistance of at least 10^9 Ωcm and a dielectric constant of not higher than 3.5, wherein the dispersed resin grains are copolymer resin grains obtained by polymerizing a solution containing at least one kind of a monofunctional monomer (A), which is soluble in said non-aqueous solvent but becomes insoluble therein by being polymerized, in the presence of a dispersion-stabilizing resin soluble in the non-aqueous solvent and an oligomer (B) having a number average molecular weight of not more than 1×10^4, said dispersion-stabilizing resin being a polymer containing at least a recurring unit represented by the following formula (I), a part of which has been crosslinked, and having a double bond group copolymerizable with the monofunctional monomer (A) bonded to only one terminal of at least one polymer main chain, and said oligomer (B) being a polymer comprising a recurring unit represented by the following formula (II and having at least one kind of a polar group selected from a carboxy group, a sulfo group, a hydroxy group, a formyl group, an amino group, a phosphono group, and

wherein R^0 represents a hydrocarbon group having from 1 to 8 carbon atoms or —OR^1 (wherein R^1 represents a hydrocarbon group having from 1 to 8 carbon atoms) bonded to only one terminal of the main chain of the polymer;



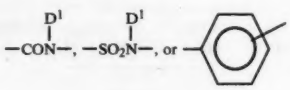
(I)

wherein X^1 represents —COO—, —OCO—, —CH_2OCO—, —CH_2COO—, —O—, or —SO_2—; Y^1 represents a hydrocarbon group having from 6 to 32 carbon atoms; and a^1 and a^2, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group having from 1 to 8 carbon atoms, —COO—Z^1 or

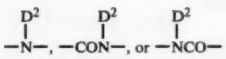
—COO—Z^1 bonded via a hydrocarbon group having from 1 to 8 carbon atoms (wherein Z^1 represents a hydrogen atom or a hydrocarbon group having from 1 to 18 carbon atoms);

(II)

wherein V^1 represents —COO—, —OCO—, —CH_2-)$_l$—COO—, —CH_2)$_l$—OCO—, —O—, —SO_2—, —CONH-COO—, —CONHCONH—,



(wherein D^1 represents a hydrogen atom or a hydrocarbon group having from 1 to 22 carbon atoms and l represents an integer of from 1 to 3); R^2 represents a hydrocarbon group having from 1 to 22 carbon atoms, said R^2 may have —O—, —CO—, —CO_2—, —OCO—, —SO_2—,



(wherein D^2 has the same meaning as D^1) in the carbon chain: and a^3 and a^4, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group having from 1 to 8 carbon atoms, —COO—D^3, or —COO—D^3 bonded via a hydrocarbon group having from 1 to 8 carbon atoms (wherein D^3 represents a hydrogen atom or a hydrocarbon group having from 1 to 8 carbon atoms which may be substituted).

5,073,472

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE REDUCING AGENT AND POLYMERIZABLE COMPOUND

Soichiro Yamamoto, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 18,660, Feb. 25, 1987, abandoned. This application Dec. 5, 1988, Ser. No. 283,033

Claims priority, application Japan, Feb. 26, 1986, 61-42747

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] G03C *1/727, 1/733*

U.S. Cl. 430—138 **4 Claims**

1. A light-sensitive element comprising a support and a light-sensitive layer containing a hydrophilic binder and at least three kinds of microcapsules (I), (II) and (III),

each of the microcapsules (I), (II) and (III) containing silver halide, a spectral sensitizing dye, a polymerizable compound having an ethylenic unsaturated group, a reducing agent having a function of reducing the silver halide or a function of accelerating or restraining a polymerization of the polymerizable compound, and a color image forming substance being selected from the group consisting of a dye, a pigment, a dye precursor and a pigment precursor, said silver halide being contained in the light-sensitive layer in such amount that the total silver content is in the range of from 0.1 mg/m^2 to 10 g/m^2, said spectral sensitizing dye being contained in the light-sensitive layer in the range of 10^{-8} to 10^{-2} mole per 1 mol of silver halide, said polymerizable compound being contained in the light-sensitive layer in an amount of 5 to 1.2×10^5 times by weight as much as the amount of silver halide, said reducing agent being contained in the light-sensitive layer in an amount of 0.1 to 1,500 mole % based on the amount of silver, and said color image forming substance being contained in the light-sensitive layer in an amount of from 0.5 to 50 parts by weight per 100 parts by weight of the polymerizable compound, and

the microcapsule (I) containing a red sensitive silver halide as the silver halide and a cyan color image forming substance as the color image forming substance, the microcapsule (II) containing a green sensitive silver halide as the silver halide and a magenta color image forming substance as the color image forming substance, and the microcapsule (III) containing a blue sensitive silver halide as the silver halide and a yellow color image forming substance as the color image forming substance.

5,073,473

METHOD OF FORMING AN IMAGE BY SILVER SALT DIFFUSION TRANSFER

Keizo Koya, and Yoshio Idota, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 188,561, Apr. 29, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 467,292

Claims priority, application Japan, Apr. 30, 1987, 62-104498

Int. Cl.[5] G03C *5/54*

U.S. Cl. 430—247 **15 Claims**

1. A method for forming an image by silver salt diffusion transfer comprising processing an imagewise exposed photosensitive element provided with a layer of photosensitive silver halide emulsion on a support, and an image-receiving element provided with an image-receiving layer containing a silver-precipitating agent on a support, with an alkali processing composition in the presence of a silver halide solvent, to convert at least part of unexposed silver halide in said emulsion layer into a transferable silver complex salt, to transfer at least part of said complex salt into said image-receiving layer, and to form an image in said image-receiving layer; and process being carried out in the presence of at least one compound represented by general formula (I):

$$PWR—(Time)_t—PUG \quad (I)$$

wherein PWR represents a group capable of releasing—(-Time)$_t$—PUG by an oxidation-reduction reaction; Time represents a group capable of releasing PUG after —(Time)$_t$—PUG is released from PWR; t is 0 or 1; and PUG represents a photographically useful group selected from the group consisting of, a nucleating agent and an ultraviolet absorber.

14. The method as claimed in claim 1, wherein said image-receiving layer comprises a silver precipitating agent capable of converting said silver complex salt, selected from the group consisting of a heavy metal, a precious metal, a heavy metal sulfide, and a heavy metal selenide.

5,073,474

RADIATION-SENSITIVE MIXTURE CONTAINING ACID LABILE GROUPS AND PRODUCTION OF RELIEF PATTERNS

Reinhold Schwalm, Wachenheim; Horst Binder, Lampertheim, and Andreas Boettcher, Nussloch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 16, 1989, Ser. No. 352,415

Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817009

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] G03F *7/039, 7/075, 7/30, 7/40*

U.S. Cl. 430—270 **10 Claims**

1. A radiation sensitive mixture containing

(a) a polymeric binder which is insoluble in water but soluble in aqueous alkaline solutions and

(b) an organic compound whose solubility in an aqueous alkaline developer is increased by the action of acid and which contains at least one acid cleavable group and

additionally a group which forms a strong acid on irradiation,

wherein the polymeric binder (a) contains from 5 to 35 mol % of monomer units having acid labile groups as copolymerized or cocondensed units or the acid labile groups introduced by polymer modification reaction.

5,073,475

PRODUCTION OF PLATE-LIKE, SHEET-LIKE OR TAPE-LIKE MATERIALS AND OF SENSITIZED LITHOGRAPHIC PRINTING PLATES

Harald Lauke, Mannheim; Gregor Schuermann, Heidelberg; Hartmut Sandig, Frankenthal, and Thomas Loerzer, Appenweier, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 23, 1990, Ser. No. 571,231

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1989, 3928794

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

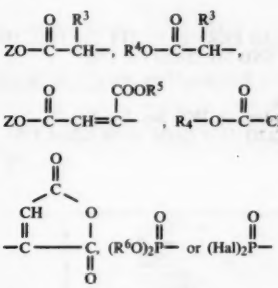
Int. Cl.[5] G03C *1/77, 1/74*

U.S. Cl. 430—278 **10 Claims**

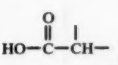
1. A process for the production of a plate-like, sheet-like or tape-like material based on mechanically, chemically, electrochemically or chemically and electrochemically roughened and anodically oxidized aluminum or aluminum alloy, the aluminum oxide layers thereof being treated with an aqueous solution of a hydrolysis product or condensate of one or more silanes of the formula (I)

$$X-(CH_2)_y-Si(R^1)_n(OR^2)_{3-n} \quad (I)$$

where R^1 and R^2 are identical or different and are each alkyl of 1 to 9 carbon atoms or aryl of 6 to 12 carbon atoms and X is one of the radicals



where R^3 is hydrogen, alkyl of 1 to 9 carbon atoms, a carboxylic acid radical of 1 to 9 carbon atoms or an anhydride ring formed from this carboxylic acid radical and the radical



bonded to R^3, R^4 and R^5 are identical or different and are each alkyl of 1 to 9 carbon atoms or aryl of 6 to 12 carbon atoms, R^6 is hydrogen, alkyl of 1 to 9 carbon atoms or aryl of 6 to 12 carbon atoms, Z is hydrogen or alkali metal, Hal is chlorine or bromine, y is an integer of from 1 to 4 and n is 0, 1 or 2, wherein the aqueous solution of the silane hydrolysis product and/or condensate additionally contains one or more compounds of the formula (II) or (III)

$$MF \quad \text{or} \quad M_2XF_6$$
$$\text{(II)} \qquad \text{(III)}$$

where M is an alkali metal and X is Ti, Zr or Si.

5,073,476

CURABLE COMPOSITION AND THE USE THEREOF

Kurt Meier, Allschwil; Giuliano Eugster, Itingen; Franz Schwarzenbach, Reinach, and Hans Zweifel, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 10, 1984, Ser. No. 608,753

Claims priority, application Switzerland, May 18, 1983, 2691/83-1

Int. Cl.[5] C08F *4/42;* **C08G** *59/68;* **G03F** *7/004, 7/029*

U.S. Cl. 430—280 **16 Claims**

1. A curable composition containing a) a material which is polymerizable by free radicals or cations, a mixture of said materials or a metal which is polymerizable by free radicals and cations, b) at least one iron compound of the formula I

$$[(R^1)\,(R^2Fe^{II})_a]^{+a}\,\frac{q}{q}\,(LQ_m)^{-q} \quad (I)$$

in which a is 1 or 2 and q is 1, 2 or 3, L is a divalent to heptavalent metal or non-metal, Q is a halogen atom, m is an integer corresponding to the sum of the valencies of L and q, R^1 is a π-arene and R^2 is the anion of a π-arene, and c) at least one electron acceptor as an oxidising agent.

5,073,477

PHOTOSENSITIVE RESIN COMPOSITION

Hidefumi Kusuda, Takatsuki; Katsuji Konishi, Ibaraki, and Koichi Ueda, Neyagawa, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Dec. 4, 1990, Ser. No. 621,435

Claims priority, application Japan, May 28, 1988, 63-131192

Int. Cl.[5] G03F *7/031, 7/033*

U.S. Cl. 430—287 **10 Claims**

1. A photosensitive resin composition for flexographic printing, comprising;

(A) a partially crosslinked copolymer prepared by a radical emulsion polymerization of a monomer mixture which comprises;

(i) 40 to 95 mol % of an aliphatic conjugated diene monomer,

(ii) 1 to 30 mol % of an alpha, betaethylenically unsaturated carboxylic acid, and

(iii) 0.1 to 10 mol % of a compound having at least two addition polymerizable groups,

(B) a linear polymer having a molecular weight of at least 5,000, which has at least 30 mol % of a conjugated diene unit,

(C) a basic nitrogen atom-containing compound,

(D) a photopolymerizable ethylenically unsaturated monomer, and

(E) a photopolymerization initiator.

5,073,478

METHOD OF MAKING A PATTERN

Christopher P. Banks, Saffron Walden, and Edward Irving, Burwell, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 20, 1989, Ser. No. 439,724

Claims priority, application United Kingdom, Nov. 29, 1988, 8827847

Int. Cl.[5] G03F *7/16, 7/32*

U.S. Cl. 430—317 **12 Claims**

1. A method of making a pattern of an electrically conductive material which comprises

(i) electrodepositing on an electrical conductive surface a film comprising a photocurable organic resin,

(ii) forming on the electrodeposited film a predetermined pattern of a resist co-cured with underlying areas of the electrodeposited film by exposure to actinic radiation, by

(a) applying a layer of the resist over the electrodeposited film,

(b) irradiating the resist layer with actinic radiation in a predetermined pattern, thereby photocuring the resist and the underlying electrodeposited film in exposed areas, and

(c) removing unexposed areas of the irradiated resist layer, thereby leaving predetermined areas of the electrodeposited film uncovered, and

(iii) removing the uncovered areas of the electrodeposited film by treatment with a solvent therfor, thereby forming a surface comprising bare conductive material in predetermined areas and, in other predetermined areas, photocured resist securely bonded to the electrically conductive surface through the cured areas of the electrodeposited film covered by the resist.

5,073,479

CHEMICAL SENSITIZATION OF PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Jean F. Reber, Marly, Switzerland, assignor to Ilford AG, Fribourg, Switzerland

Filed Oct. 15, 1990, Ser. No. 597,851

Claims priority, application United Kingdom, Oct. 14, 1989, 8923220

Int. Cl.[5] G03C *1/005*

U.S. Cl. 430—569 **11 Claims**

1. A process for the production of a silver halide emulsion wherein the chemical sensitization step is carried out in the presence of N-methyl formamide.

5,073,480

QUICK ACTING HARDENER FOR PHOTOGRAPHIC GELATIN LAYERS

Piet Kok, Gent, and Erik V. Van der Eycken, Berchem, both of Belgium, assignors to AGFA-Gevaert, N.V., Mortsel, Belgium

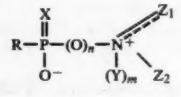
Filed Jul. 11, 1990, Ser. No. 551,030

Claims priority, application European Pat. Off., Jul. 14, 1989, 89201865.6

Int. Cl.[5] H03C *1/30*

U.S. Cl. 430—623 **11 Claims**

1. Process for hardening proteinaceous materials by contacting the said materials with a quick acting hardener corresponding to the following formula;



wherein:

Z_1 and Z_2 each independently represent substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, or Z_1 represents substituted or unsubstituted alkylidene or Z_1 and Z_2 together represent the atomic grouping required to complete a 5- or 6-membered substituted or unsubstituted heterocyclic ring, including an aromatic heterocyclic ring and including such a ring with a ring fused-on, which atomic grouping may contain other hetero atoms in addition to the nitrogen atom;

Y represents substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl;

X represents O or S;

R represents substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, substituted or unsubstituted alkyloxy, substituted or unsubstituted aryloxy, substituted or unsubstituted alkylthio, substituted or unsubstituted arylthio, substituted or unsubstituted amino or O^-;

n represents 0 or 1, and

m represents 0 or 1, m being 0 if the nitrogen to which Y is attached is involved in a double bond.

5,073,481

ASSAY TO DETECT THE PRESENCE OF LIVE VIRUS IN VITRO

Jerome B. Zeldis, Newton Highlands, Mass.; Robert P. Gale, Bel Air, Calif.; Howard N. Steinberg, Brookline, Mass., assignors to Beth Israel Hospital Association, Boston, Mass.

Continuation of Ser. No. 175,682, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 893,678, Aug. 6, 1986, abandoned. This application Nov. 30, 1989, Ser. No. 443,823

Int. Cl.[5] C12Q *1/70, 1/02;* **C12N** *7/04;* **A61K** *39/12*

U.S. Cl. 435—5 **24 Claims**

1. A method for detecting the presence of hepatitis viruses in a sample of body fluid or biological preparation comprising:

a) providing a source of live hepatitis virus-free cells obtained from bone marrow of peripheral blood;

b) isolating mononuclear cells from the cells obtained in step a);

c) enriching the mononuclear cells with a growth factor;

d) incubating the mononuclear cells with the sample to be tested under conditions which promote the proliferation of mononuclear stem cells to form colonies;

e) counting the number of colonies that arise from the incubation; and

f) comparing the number colonies to a control to detect the presence of live hepatitis virus wherein the presence of live hepatitis virus is related to the inhibition of colony growth.

5,073,482

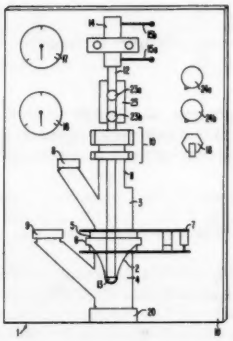
ELASTIC BARRIER PERMEABILITY TESTING DEVICE AND METHOD OF USE

Andrew S. Goldstein, Portland, Oreg., assignor to Epitope, Inc., Beaverton, Oreg.

Filed Jun. 21, 1988, Ser. No. 209,373

Int. Cl.[5] C12Q *1/70;* **G01N** *15/08;* **G01M** *3/02*

U.S. Cl. 435—5 **32 Claims**



17. A method for testing an elastic membrane for permeability to particles comprising the steps of: (a) interposing the membrane between (i) said particles in a fluid medium and (ii) a reagent for detecting the presence of said particles; (b) repeatedly applying mechanical stress to the membrane as interposed, such that the membrane is alternately stretched and released to its original position; and (c) determining whether any of said particles passed through the membrane.

5,073,483

METHOD OF STAINING NUCLEIC ACIDS DETECTED BY NON-RADIOACTIVE LABELLING AND KIT OF REACTANTS FOR CARRYING OUT THE METHOD

Philippe Lebacq, Paris, France, assignor to Bioprobe Systems, Paris, France,

Filed Mar. 24, 1989, Ser. No. 328,340

Claims priority, application France, Mar. 25, 1988, 88 03982; Mar. 10, 1989, 89 03191

Int. Cl.[5] C12Q *1/68, 1/34, 1/42;* G01N *33/53*

U.S. Cl. 435—6 16 Claims

1. In a method for colorimetric detection of a nucleic acid sequence wherein the nucleic acid sequence is fixed on a solid support and an enzymatic detection system is used to detect the nucleic acid sequence by non-isotopic labelling, the improvement comprising reversibly colorimetrically staining the non-isotopically labelled nucleic acid sequence on the solid support by the sequential steps of:

(a) reacting the non-isotopically labelled nucleic acid sequence with a developer solution comprising a sulfur-containing organic compound containing a bond with a sulfur atom which constitutes a substrate for the enzymatic system and is hydrolyzed by said enzymatic system to form an organic thiol;

(b) reacting with the organic thiol a metallic compound which is soluble and stable in aqueous solution to form a metal-sulfur compound complex having a characteristic color which precipitates in situ and which may subsequently be decolorized; and

(c) decolorizing the colorimetrically stained labelled nuclear acid sequence with a reducing agent for the metal-sulfur complex whereby the solid support may be reused.

5,073,484

QUANTITATIVE ANALYSIS APPARATUS AND METHOD

Melvin J. Swanson, Carver, and Patrick E. Guire, Eden Prairie, both of Minn., assignors to Bio-Metric Systems, Inc., Eden Prairie, Minn.

Continuation-in-part of Ser. No. 356,459, Mar. 9, 1982, abandoned. This application Feb. 23, 1983, Ser. No. 467,229

Int. Cl.[5] C12Q *1/00;* G01N *33/53, 30/02, 30/90, 21/75, 21/77, 33/558, 33/543, 21/00, 31/22, 23/06*

U.S. Cl. 435—7.92 26 Claims

1. A method for the analysis of an analyte in a test solution comprising the steps of:

(a) non-diffusively immobilizing in each of a predetermined number of successive, spaced reaction zones of a liquid permeable medium a reactant capable of reacting with the analyte to form a predetermined product;

(b) flowing said solution along the medium and sequentially through the reaction zones; and

(c) detecting the presence of analyte, said reactant or said predetermined product in the reaction zones, wherein the number of zones in which detection occurs is related to the amount of analyte in the solution.

5,073,485

IMMUNOASSAY METHOD CONDUCTED AT LOW PH

Yoshiyuki Amano, Kyoto; Jun-ichiro Kikutake, Ibaraki, and Masakazu Sugiura, Kyoto, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Nov. 7, 1989, Ser. No. 432,916

Claims priority, application Japan, Nov. 7, 1988, 63-280667

Int. Cl.[5] G01N *33/552*

U.S. Cl. 435—7.94 20 Claims

1. An immunoassay method, which comprises the steps of:

(1) reacting a material (A) to be measured, an immobilized component (B) which binds specifically to the material (A), and a labelled component selected from the group consisting of

(i) a labelled component (C) which binds specifically to the material (A) and

(ii) a labelled material (A*) formed by labelling the same material as the material (A), thereby obtaining an immuno-complex; and

(2) detecting or determining the labelling fragment, wherein the reaction of the material (A) with the immobilized component (B) or the reaction of the material (A) with the immobilized component (B) and said labelled component is carried out at a pH of 2–4.5 and a temperature not more than 50° C., the pH being adjusted with a buffer containing an acid component selected from the group consisting of acetic, hydrochloric, succinic, maleic, barbituric, benzoic and p-hydroxy-benzoic acids, wherein at least one, of (A) and (B) is an antigen or an antibody.

5,073,486

ASSAY FOR *MYCOPLASMA FERMENTANS*

Warren J. Leonard, Bethesda; Julie B. Wolf, Columbia, both of Md., and Nancy F. Halden, Reston, Va., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Division of Ser. No. 260,829, Oct. 21, 1988, Pat. No. 4,935,367, which is a continuation-in-part of Ser. No. 169,487, Mar. 17, 1988, abandoned. This application Apr. 4, 1990, Ser. No. 504,306

Int. Cl.[5] C12R *1/35;* C12Q *1/34;* C12N *9/22*

U.S. Cl. 435—19 2 Claims

1. An assay for detecting the presence of *Mycoplasma fermentans*, comprising the steps of:

(a) obtaining a nuclear extract from a sample of cells suspected of the presence of *Mycoplasma fermantans*; and

(b) testing the extract of step (a) for Mfe I activity, the presence of Mfe I activity being indicative of the presence of *Mycoplasma fermentans.*

5,073,487

RAPID ASSAY FOR FUNCTIONAL HUMAN α_1-PROTEINASE INHIBITOR

Cynthia A. Lloyd, Athens, Ga., assignor to Athens Research and Technology, Inc., Athens, Ga.

Filed Jan. 30, 1989, Ser. No. 303,904

Int. Cl.[5] C12Q *1/37*

U.S. Cl. 435—23 17 Claims

1. A method for detecting the presence of functional non α_2-macroglobulin inhibitors of enzymes that are inhibited by α_2-macrogobulin in a sample derived from human tissue or fluids comprising providing in an assay:

a specific inactivator of α_2-macroglobulin and not of the inhibitor to be detected;

a specific substrate for an enzyme that is inhibited by α_2-macroglobulin and by the inhibitor to be detected, wherein the substrate results in a detectable product when reacted;

the enzyme in a known quantity; and

the sample to be assayed for the presence of inhibitor other than α_2-macroglobulin.

5,073,488

RAPID METHOD FOR DETERMINING EFFICACY OF A STERILIZATION CYCLE AND RAPID READ-OUT BIOLOGICAL INDICATOR

Richard R. Matner, St. Paul; William E. Foltz, Cottage Grove, and Lewis P. Woodson, Egan, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 29, 1988, Ser. No. 277,305
Int. Cl.[5] C12Q *1/00, 1/25*
U.S. Cl. 435—31 25 Claims

1. A method for rapidly determining the effectiveness of a sterilization cycle, comprising the steps of:

a) subjecting to said sterilization cycle of a source of active enzyme which provides a detectable amount of said enzyme, said enzyme having sufficient activity following a sterilization cycle which is sublethal to at least one test microorganism commonly used to monitor sterilization, to react with an effective amount of a substrate system for said enzyme to produce a detectable enzyme-modified product within less than twenty-four hours, yet said enzyme having activity which is reduced to "background" following a sterilization cycle which is lethal to said test microorganism;

b) incubating said enzyme, following the completion of said sterilization cycle, with an effective amount of an enzyme substrate system capable of reacting with any residual active enzyme to produce a detectable enzyme-modified product, for a time period and under conditions sufficient to promote reaction of any enzyme remaining active with said substrate.

5,073,489

METHOD FOR GENETICALLY MARKING YEAST

George D. Clark-Walker, Deakin, Australia, assignor to The Australian national University, Australian Capitol Territory, Australia

Continuation of Ser. No. 94,729, Aug. 28, 1987, abandoned. This application Feb. 26, 1990, Ser. No. 485,767
Claims priority, application Australia, Nov. 21, 1985, 3512/85
Int. Cl.[5] C12P *21/00;* C07H *15/12;* C12Q *1/68;* C12N *1/18*
U.S. Cl. 435—172.3 7 Claims

1. A method for genetically marking a strain of yeast *Saccharomyces cerevisiae* wherein said marking comprises the gene order of the mitochondrial DNA of the yeast which is rearranged by recombination; said method comprising:

crossing two respiratory deficient petite mutant strains of *Saccharomyces cerevisiae* wherein each of said respiratory deficient petite mutants has a region of deletion in the mitochondrial DNA; said region including a deleted segment which is essential for respiration and a deleted non-essential segment; said deleted non-essential segment being the same in both mutants and said deleted essential segment being different in each mutant; whereby said crossing produces a diploid strain wherein the genes common to both parents are duplicated and the deleted non-essential segment common to both parents is absent; and

then recombining said diploid strain to remove one of each of the duplicated genes to form a genetically marked strain of yeast having a respiratory competent mitochondrial genome with a rearranged order of non-duplicated genes required for respiration relative to wild type and to the petite mutant parents and identifying and isolating said genetically marked strain of yeast with said rearranged order of mitochondrial genes from the recombinants produced.

5,073,490

TRANSHYBRIDOMAS

Charles Babinet, and Dominique Morello, both of Paris, France, assignors to Institut Pasteur, Paris, France

Continuation of Ser. No. 863,156, May 14, 1986, abandoned. This application Feb. 27, 1990, Ser. No. 488,479
Claims priority, application France, Mar. 28, 1986, 86 04556
Int. Cl.[5] C12N *5/00, 15/00*
U.S. Cl. 435—240.2 2 Claims

1. An immortalized transgenic eukaryotic cell A 15.9.

5,073,491

IMMOBILIZATION OF CELLS IN ALGINATE BEADS CONTAINING CAVITIES FOR GROWTH OF CELLS IN AIRLIFT BIOREACTORS

Philip C. Famiiletti, Millington, N.J., assignor to Hoffman-La Roche Inc., Nutley, N.J.

Filed Dec. 23, 1988, Ser. No. 289,647
Int. Cl.[5] C12N *5/00, 11/10, 5/02;* C12M *1/40*
U.S. Cl. 435—240.22 7 Claims

1. A method for carrying out cell culture in a bioreactor having a growth chamber for receiving the cells, comprising:

a) selecting cells to be grown in the bioreactor;

b) selecting alginate which is liquid where in a non-polymerized state and semi-solid when in a polymerized state;

c) combining a liquid growth medium and the alginate to form an alginate solution;

d) selecting gelatin particles which are solid at about room temperature and liquid at pre-selected elevated temperature;

e) combining the cells with the gelatin particles to form a cell-gelatin particle suspension;

f) mixing the alginate solution with the cell-gelatin particle suspension to form an alginate-cell-gelatin suspension;

g) introducing the alginate-cell-gelatin suspension into the growth chamber of the bioreactor and polymerizing the alginate to form alginate beads having the cells and gelatin particles entrapped therein;

h) heating the alginate beads within the growth chamber to dissolve the gelatin particles and thereby form cavities within the alginate beads said cavities containing the cells to be grown in the bioractor;

i) introducing growth medium into the growth chamber of the bioreactor into contact with said alginate beads and introducing a gentle stream of oxygen containing gas up through the growth medium at a flow rate which is sufficient to lift liquid growth medium while contacting said alginate beads in the growth chamber; and

j) recirculating upwardly lifted liquid growth medium in contact with said alginate beads so that oxygen is absorbed from the liquid growth medium into the cavities of the alginate beads whereby growth of the cells occurs in the cavities.

5,073,492

SYNERGISTIC COMPOSITION FOR ENDOTHELIAL CELL GROWTH

Chung-Ho Chen, and Sumi C. Chen, both of Phoenix, MD., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Jan. 9, 1987, Ser. No. 1,844
Int. Cl.[5] C12N *5/00*
U.S. Cl. 435—240.2 5 Claims

1. A method for synergistically enhancing endothelial cell growth in an in vitro culture which comprises adding to said culture, VEGF, uridine, thymidine and serum-derived factor in synergistically effective amount.

5,073,493

MONOCLONAL ANTIBODY NKY13

Ikuo Yamashina, Kyoto, Japan, assignor to Ikuo Yamashina, Kyoto, Japan

Filed May 26, 1988, Ser. No. 200,524
Claims priority, application Japan, May 29, 1987, 62-137012
Int. Cl.[5] C12N *5/20, 15/02;* C07K *15/28;* C12P *21/08*
U.S. Cl. 435—240.27 2 Claims

1. Hybridoma NKY 13 deposited with the ECACC having the accession No. 87052601.

5,073,494

HUMAN TISSUE PLASMINOGEN ACTIVATOR SUBSTITUTED AT POSITION 275 OR AT POSITIONS 275 AND 277

Herbert L. Heyneker, Hillsborough, and Gordon A. Vehar, San Carlos, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.

Continuation of Ser. No. 186,494, Apr. 26, 1988, abandoned, which is a continuation of Ser. No. 71,506, Jul. 9, 1987, abandoned, which is a continuation of Ser. No. 846,697, Apr. 19, 1986, abandoned, which is a continuation of Ser. No. 725,468, Apr. 22, 1985, abandoned. This application May 11, 1990, Ser. No. 522,480
Int. Cl.[5] C12N *9/64*
U.S. Cl. 435—226 7 Claims

1. A human tissue plasminogen activator (t-PA) mutant produced by recombinant host cells, in which position 275 is substituted by an amino acid other than arginine by site directed mutagenesis.

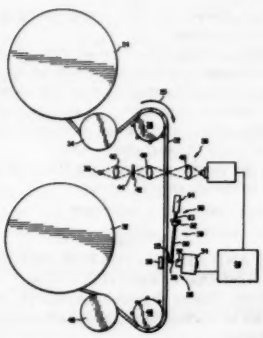
4. A human tissue plasminogen activator (t-PA) mutant produced by recombinant host cells, in which position 275 is substituted by an amino acid other than arginine and in which position 277 is substituted by an amino acid other than lysine, by site directed mutagenesis.

5,073,495

APPARATUS FOR ISOLATING CLONED VECTORS AND CELLS HAVING A RECOVERY DEVICE

Norman G. Anderson, Rockville, Md., assignor to Large Scale Biology Corporation, Rockville, Md.

Filed Oct. 21, 1988, Ser. No. 260,724
Int. Cl.[5] C12M *3/00, 1/26*
U.S. Cl. 435—284 33 Claims



1. An apparatus for isolating a sample of cloned phage or viral vectors comprising

(a) a film carrying a gelled culture medium between spacers extending parallel to longitudinal edges of the film,

(b) a lawn of cells growing on said culture medium, said cells characterized as being susceptible to infection by phage or viral vectors, said sample on the lawn of cells,

(c) recovery means for selectively removing said sample from the lawn of cells and transferring said removed sample to a site remote from the film, said recovery means being a hammer assembly comprising a hammer, a tip at one end of said hammer, and a plunger, said plunger being movable into engagement with said hammer so as to strike said tip to cause said tip to impact said cell lawn and remove the sample from the cell lawn, and

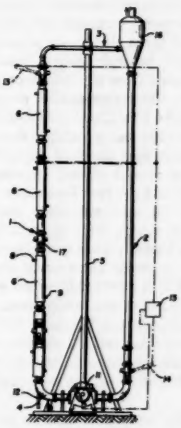
(d) drive means to move said film past said recovery means.

5,073,496

APPARATUS FOR CONTROLLING AND PERFORMING A MICROBIOLOGICAL OR ENZYMATIC PLUG FLOW PROCESS

Nicolaas M. G. Oosterhuis, Abdijberg 83, 4707 MZ Roosendaal, and Kees Koerts, Buntlaan 43, 3971 JB Driebergen, both of Netherlands

Division of Ser. No. 796,919, Nov. 12, 1985, Pat. No. 4,935,348. This application Jan. 13, 1989, Ser. No. 297,074
Claims priority, application Netherlands, Nov. 15, 1984, 8403497; Mar. 4, 1985, 8500602
Int. Cl.[5] C12M *1/36*
U.S. Cl. 435—289 3 Claims



1. Reactor for the carrying out of microbiological or enzymatic processes comprising a circulation tube, at least one static in-line mixer inside said tube, a mechanical pump for the circulation of reaction components fed into said tube, and a gas-liquid separator, wherein said circulation tube is a vertical tube loop having a substantially vertical rising tube, a substantially vertical downtube and two connector tubes connecting said riser tube and said downtube at their respective upper and lower ends, the length of said connector tubes being small with respect to the length of said rising tube and said downtube, said at least one static in-line mixer having a design which ensures plug flow and being disposed inside said rising tube, and said gas-liquid separator having a position at the uppermost part of said tube loop, said reactor further comprising first measuring means positioned at the upper end of said rising tube for measuring the maximum concentration of one or more reaction substrates or a value derived therefrom, second measuring means positioned at the lower end of said downtube for measuring the minimum concentration of one or more reaction substrates or a value derived therefrom, and regulating means connected to said pump, said first measuring means and said second measuring means for regulating the speed of said pump in response to the measured concentrations of said first and second measuring means.

5,073,497

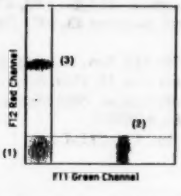
MICROBEAD REFERENCE STANDARD AND METHOD OF ADJUSTING A FLOW CYTOMETER TO OBTAIN REPRODUCIBLE RESULTS USING THE MICROBEADS

Abraham Schwartz, Hato Rey, P.R., assignor to Caribbean Microparticles Corporation, Hato Rey, P.R.

Continuation-in-part of Ser. No. 374,435, Jun. 30, 1989, which is a continuation-in-part of Ser. No. 128,786, Dec. 4, 1987, Pat. No. 4,857,451, which is a continuation-in-part of Ser. No. 805,654, Dec. 11, 1985, Pat. No. 4,774,189, which is a continuation-in-part of Ser. No. 685,464, Dec. 24, 1984, Pat. No. 4,767,206. This application Jan. 16, 1990, Ser. No. 465,792

Int. Cl.[5] G01N *31/00;* **G01J** *3/30, 1/02*

U.S. Cl. 436—8 **19 Claims**



1. A microbead reference standard for adjustment of a flow cytometer, for subsequent measurement of a selected sample, said sample selected from the group consisting of cells and particles, said sample labeled with at least two fluorescent dyes, said dyes selected from the group consisting of fluorescein, phycoerythrin, allophycocyanine, propidium iodide, the fluorochrome Hoescht 33342, and a sulfonyl chloride derived from sulforhodamine 101, using multiple fluorescence channels of the flow cytometer, said standard comprising a population of microbeads, wherein each of said microbeads:

(a) is labeled with at least two fluorescent dyes that are the same, and have the same excitation and emission spectra, as the dyes with which the sample is labeled so that the dyes on the microbeads have fluorescence intensity levels registerable in multiple fluorescent channels of a flow cytometer, said dyes selected from the group consisting of fluorescein, phycoerythrin, allophycocyanine, propidium iodide, the fluorochrome Hoescht 33342, and a sulfonyl chloride derived from sulforhodamine 101;

(b) is of substantially similar size, said microbead population having a coefficient of variation of diameter of about 2% or less; and

(c) is substantially equivalent in size to the fluorescently labeled sample, wherein the microbeads allow reproducibility of data to be obtained which is independent of specific flow cytometer and time frame of data measurement and compensation of the flow cytometer.

5,073,498

FLUORESCENT ALIGNMENT MICROBEADS WITH BROAD EXCITATION AND EMISSION SPECTRA AND ITS USE

Abraham Schwartz, and Emma F. Repollet, both of Hato Rey, P.R., assignors to Caribbean Microparticles Corporation, Hato Rey, P.R.

Continuation-in-part of Ser. No. 465,792, Jan. 16, 1990, which is a continuation-in-part of Ser. No. 374,435, Jun. 30, 1989, which is a continuation-in-part of Ser. No. 128,786, Dec. 4, 1987, Pat. No. 4,857,451, which is a continuation-in-part of Ser. No. 805,654, Dec. 11, 1985, Pat. No. 4,774,189, which is a continuation-in-part of Ser. No. 685,464, Dec. 24, 1984, Pat. No. 4,767,206. This application Mar. 16, 1990, Ser. No. 494,975

Int. Cl.[5] G01N *21/00, 31/00*

U.S. Cl. 436—8 **12 Claims**

1. A microbead population for alignment of a flow cytometer or fluorescence microscope, comprising microbeads which are highly uniform in size, said microbeads having a coefficient of variation of less than 2% in diameter; each of said microbeads containing one or more fluorescent dyes so that each of said microbeads fluoresces over a wide range of excitation wavelengths and fluoresces white under a long wavelength ultraviolet lamp; said dyes selected form the group consisting of (a) coumarin 487, coumarin 525, and oxazine 1; and (b) Hoechst 33342, rhodamine 101 and acridine orange; said microbeads having a fluorescence signal distribution with a coefficient of variation of less than 4%, wherein said microbeads may be used to align lasers at a plurality of wavelengths.

12. A method of aligning a microscope having lasers at a plurality of wavelengths, comprising utilizing microbeads which fluoresce white under a long wavelength ultraviolet lamp, said microbeads being highly uniform in size, said microbeads having a coefficient of variation of less than 2% in diameter; each of said microbeads continuing one or more fluorescent dyes, fluorescing over a wide range of excitation wavelengths, and having a fluorescence signal distribution with a coefficient of variation of less than 4%, said dyes selected from the group consisting of (a) coumarin 487, coumarin 525, and oxazine 1; and (b) Hoechst 33342, rhodamine 101 and acridine orange.

5,073,499

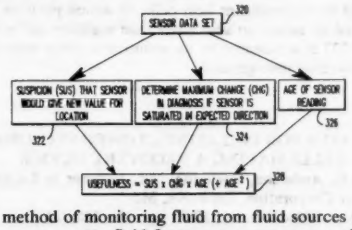
CHEMICAL DIAGNOSTIC SYSTEM

James C. Bellows, Maitland, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 15, 1988, Ser. No. 182,019

Int. Cl.[5] G01N *1/16, 31/04, 31/08;* **G06F** *15/46*

U.S. Cl. 436—50 **12 Claims**


320
SENSOR DATA SET
SUSPICION (SUS) THAT SENSOR WOULD GIVE NEW VALUE FOR LOCATION
DETERMINE MAXIMUM CHANGE (CHG) IN DIAGNOSIS IF SENSOR IS SATURATED IN EXPECTED DIRECTION
AGE OF SENSOR READING
322
324
326
USEFULNESS = SUS x CHG x AGE (+ AGE²)
328

1. A method of monitoring fluid from fluid sources using a piping array to route fluid from any source to any of plural chemical monitors in a processing system being monitored for chemical malfunctions by a diagnostic system, comprising the steps of:

(a) diagnosing a malfunction of the processing system using the diagnostic system;

(b) determining a usefulness of an analysis of each source fluid by each monitor where usefulness comprises a greatest expected change in a malfunction diagnosis confidence when each monitor is saturated in an expected direction;

(c) determining and implementing a configuration of the piping array from the usefulness; and

(d) sampling the fluids, analyzing the fluids and providing the results to the diagnostic system.

5,073,500

METHOD AND APPARATUS FOR DETECTING URINARY CONSTITUENTS

Shiro Saito; Kenji Shirai; Ryuichi Kawamoto, and Shigeru Sakakibara, all of Aichi, Japan, assignors to Inax Corporation, Aichi, Japan

Filed Dec. 28, 1988, Ser. No. 291,168

Claims priority, application Japan, Jan. 8, 1988, 63-2729; Jan. 8, 1988, 63-2730; Feb. 15, 1988, 63-32353; Jun. 2, 1988, 63-73675[U]; Jul. 16, 1988, 63-177595; Jul. 16, 1988, 63-177596

Int. Cl.[5] G01N *35/08*

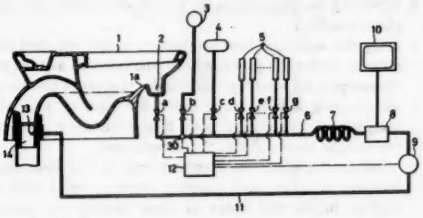
U.S. Cl. 436—53 **22 Claims**

1. A method of investigating urinary constituents with a measuring device, comprising the steps of:

collecting urine in a urine collection chamber of a toilet

bowl defined by a housing having an open end for receiving the urine, a partition member positioned to divide the housing into said urine collection chamber and a water chamber, said partition member having an opening for receiving a piston, said piston being slidably and sealingly mounted in said opening, said piston having a cross section smaller than the cross section of the urine collection chamber, a lower end of said piston having water tight sealing means in engagement with said water chamber;

diluting the collected urine by moving said piston into the collection chamber to expel a portion of the collected urine, withdrawing the piston from the collection chamber, and adding diluting liquid from said water chamber to the remaining portion of the collected urine, said water



chamber having inlet and outlet means for receiving and discharging water, conduit means for delivering and discharging water from said water chamber, means in said conduit means for controlling the flow of water to the inlet and outlet means of said water chamber, said conduit means being operatively connected to an inlet in said urine collection chamber, said urine collection chamber having an outlet means for delivering the urine sample;

forcing the diluted urine into a conduit to supply the urine to the measuring device;

injecting gas into the urine contained in the conduit to divide the urine into plural aliquots which are separated from each other by intervening gas; and

introducing the aliquots successively into the measuring device to investigate constituents of the aliquots.

5,073,501

METHOD FOR DETERMINING THE CONCENTRATION OF CATIONS IN A SAMPLE

Eddy Chapoteau, Brooklyn; Bronislaw P. Czech, Peekskill; Carl R. Gebauer, Crompond; Koon-Wah Leong, Ossining, and Anand Kumar, Southfields, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

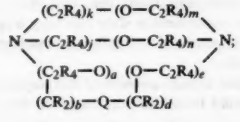
Division of Ser. No. 38,843, Apr. 15, 1987, Pat. No. 4,808,539.
This application Jan. 30, 1989, Ser. No. 304,356
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[5] G01N *33/20*
U.S. Cl. 436—74 **16 Claims**

1. A method for determining the concentration of cations present in a test sample containing interfering cations, comprising the steps of:

(a) preparing a reagent mixture consisting essentially of:

(i) a surfactant;

(ii) a 3.2.2 or 3.3.2 chromogenic cryptand having the formula:



wherein,

k and j, either same or different, are equal to 1 to about 5;

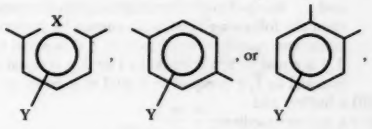
m and n, either same or different, are equal to 0 to about 4;

a and e, either same or different, are equal to 0 to about 2;

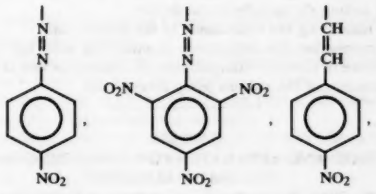
b and d, either same or different, are equal to 0 to about 5;

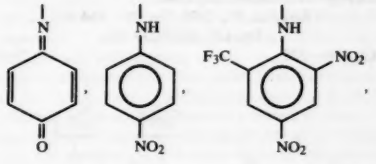
R, either same or different, is hydrogen, lower alkyl, lower alkylidene, lower alkenyl, allyl, or aryl; and

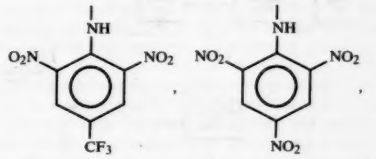
Q is

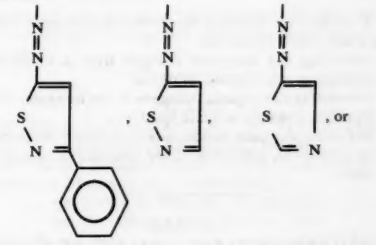


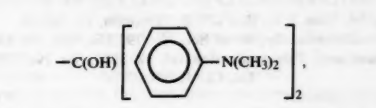
wherein X is CH, N, or COH; and Y includes



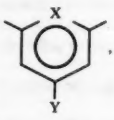








except that when Q is



wherein Y is selected from the group consisting of *p*-nitrophenylazo, 3-phenylisothiazolyl-5-azo, isothiazolyl-5-azo, thiazolyl-5-azo, 2,4,6-trinitrophenylazo, *p*-nitrostyryl, *p*-benzoquinonemonoimino, and bis-(*p*-dimethylaminophenyl)hydroxymethyl, then the following conditions cannot be present: that simultaneously b is equal to 0 or 1, d is equal to 0 or 1, j is equal to 1, n is equal to 1 or 2, a is equal to 1, e is equal to 1, k is equal to 1, and m is equal to 2;

(iii) a buffer; and

(iv) a solvent medium;

(b) adding the reagent mixture to a device consisting of a dimensionally stable, uniformly porous, diffusely reflective single- or multi-layer, formed of a polymeric matrix;

(c) evaporating the solvent medium of the reagent mixture;

(d) adding the sample to the device;

(e) measuring the reflectance of the device; and

(f) comparing the reflectance so measured with the reflectance of standard compositions containing known concentrations of the cations being determined.

5,073,502

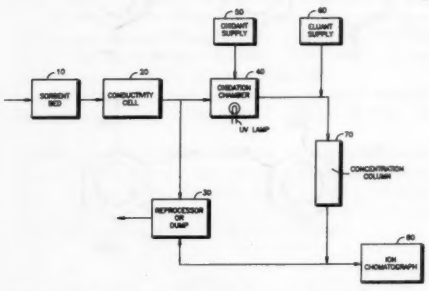
METHOD AND APPARATUS FOR ANALYZING TOTAL ORGANIC HALOGENS

John W. Steele, Torrington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jan. 27, 1990, Ser. No. 544,766

Int. Cl.[5] G01N *33/00*

U.S. Cl. 436—125 **23 Claims**



1. A method for detecting the presence of organic halogens in a liquid, which comprises:

a. removing any inorganic halogen from a liquid sample containing any organic halogens;

b. converting the organic halogens in the inorganic halogen free liquid sample to ionic halides;

c. analyzing the ionic halides in an ion chromatograph so as to provide an indication of the presence of organic halogens.

5,073,503

BIOTHERMOGRAPHIC ANALYSIS OF PLANTS

John M. Mee, P.O. Box 25896, Honolulu, Hi. 96825

Continuation-in-part of Ser. No. 792,564, Oct. 29, 1985, abandoned. This application Jul. 12, 1989, Ser. No. 378,458

Int. Cl.[5] G01N *25/20*

U.S. Cl. 436—147 **4 Claims**

1. A method of biothermographically screening plants for seedling vigor under a specific set of environmental conditions comprising the steps of:

a. isolating and weighing a viable plant sample comprising a plant at any life stage or a viable part thereof;

b. placing the plant sample in a sealed apparatus wherein the sample can be subjected to a specific set of physical, chemical or biological conditions and wherein the total heat production from the sample over a given period of time can be measured, without affecting the viability of the plant sample;

c. subjecting the plant sample in the apparatus to a specific set of physical, chemical or biological conditions for a given period of time and measuring the total heat production of the plant sample during that given period of time without affecting the viability of the plant sample;

d. repeating the above steps for at least one additional viable plant sample;

e. using the measured heat production of the weighed plant samples under the given set of conditions so as to screen the samples for seedling vigor under that set of conditions;

f. determining a biothermal index for each of said plant samples by dividing the total heat production measured per sample by weight of the sample; and

g. ranking the plant samples in terms of the determined biothermal index, and selecting those samples with the highest biothermal index as those having the greatest seedling vigor.

5,073,504

APPARATUS AND METHOD FOR IMMUNOHISTOCHEMICAL STAINING

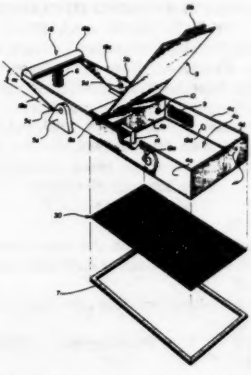
Steven A. Bogen, 59 Millstone Rd., Readville, Mass. 02136

PCT No. PCT/US88/02605, § 371 Date Jan. 29, 1990, § 102(e) Date Jan. 29, 1990

PCT Filed Jul. 29, 1988, Ser. No. 459,747

Int. Cl.[5] G01N *1/00*; B01L *3/02*

U.S. Cl. 436—174 **41 Claims**



41. A method for the application of a fluid to and removal of a fluid from a slide comprising the steps of:

providing an impermeable slide carrying a specimen;

apposing an aperture of a chamber to a portion of the impermeable slide;

adding a liquid to said portion of the impermeable slide;

aspirating liquid from the portion of the impermeable slide; and

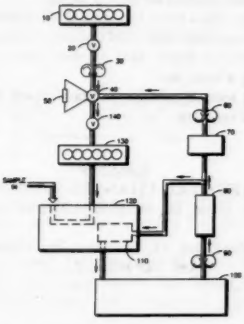
removing the aperture from the slide.

5,073,505

ELUANT STORAGE AND PREPARATION APPARATUS AND METHOD FOR USING THE SAME IN A ZERO GRAVITY ENVIRONMENT

Timothy A. Nalette, Tolland, and John W. Steele, Torrington, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 27, 1990, Ser. No. 544,765
Int. Cl.[5] G01N *1/18, 1/10;* C22C *38/28, 38/24*
U.S. Cl. 436—178 11 Claims



1. A zero gravity compatible system for chemical group analysis, which comprises:

a. a concentrated eluant reservoir for storing concentrated eluant comprising at least one bladder;

b. a sample loop, in flow communication with said concentrated eluant reservoir and means for introducing water therein;

c. a dilute eluant reservoir, in flow communication with the sample loop, for receiving and storing eluant from the sample loop, said dilute eluant reservoir having at least one bladder having a means for receiving said eluant from the sample loop, means for receiving water and a means for releasing dilute eluant;

d. a means for introducing at least one ionizable chemical group to the dilute eluant;

e. a means for analyzing said chemical group in the dilute eluant in flow communication with said dilute eluant reservoir and comprising a exiting means for the dilute eluant;

f. a means for removing ions from the dilute eluant from said exiting means, so as to reclaim the water, in flow communication with said exiting means;

g. a means for detecting ions in the reclaimed water so as to ensure that the reclaimed water is essentially deionized; and

h. a water reservoir in flow communication with the means for detecting ions in the reclaimed water and the sample loop and the dilute eluant reservoir, for storing water and the reclaimed water.

7. A process for storing, preparing and using eluant in chemical group analysis, which comprises:

a. introducing concentrated eluant to a sample loop;

b. flushing the concentrated eluant form the sample loop with water;

c. introducing the flushed eluant and water into a dilute eluant reservoir;

d. diluting the flushed eluant with water to a concentration needed for a specific chemical group analysis forming a dilute eluant;

e. introducing an ionizable chemical group to the dilute eluant;

f. analyzing for a chemical group in the dilute eluant;

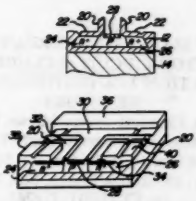
g. deionizing the analyzed dilute eluant by passing the analyzed dilute eluant through a means for removing ions from the analyzed dilute eluant and reclaiming the water and said process is performed in a zero gravity environment.

5,073,506

METHOD FOR MAKING A SELF-ALIGNED LATERAL BIPOLAR SOI TRANSISTOR

Witold P. Maszara, Columbia, and Anthony L. Caviglia, Laurel, both of Md., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Feb. 14, 1991, Ser. No. 655,477
Int. Cl.[5] H01L *21/265, 21/86, 29/73*
U.S. Cl. 437—21 9 Claims



1. A method for making a lateral bipolar transistor using SOI technology comprising:

forming a silicon island on an insulating substrate, said silicon island having a first conductivity type;

forming a base mask on said silicon island, said base mask having a top surface and sidewalls;

depositing a layer of silicon dioxide on said silicon island, said layer of silicon dioxide covering said top surface and said sidewalls of said base mask;

ion etching to remove said layer of silicon dioxide from the top surfaces of said silicon island and said base mask and to partially remove a portion of said layer of silicon dioxide deposited on said sidewall of said base mask to produce vertical side wall spacers;

locally oxidizing said silicon island to produce an oxide layer on said top surface of said silicon island not protected by said base mask and said vertical sidewall spacers;

implanting said regions of said silicon island not masked by said base mask and said vertical sidewall spacers through said oxide layer with a first dopant of a second conductivity type to form an emitter region and a collector region in said silicon island on opposite sides of said base mask;

removing said base mask by wet etching to uncover a base region;

implanting said base region with a second dopant of said first conductivity type to form a shallow base contact region, said oxide layer shielding said emitter and collector regions from being implanted by said second dopant;

ion etching to remove said oxide layer over said emitter and collector regions; and

forming silicide contacts on said emitter, collector and base contact regions using said vertical sidewall spacers as a mask.

5,073,507

PRODUCING A PLASMA CONTAINING BERYLLIUM AND BERYLLIUM FLUORIDE

Charles T. Keller, Tempe, and Schyi-Yi Wu, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 4, 1991, Ser. No. 664,142
Int. Cl.[5] H01L *21/00, 21/02, 21/306*
U.S. Cl. 437—22 9 Claims

1. A method of simultaneously implanting beryllium ions and fluorine ions into a III-V semiconductor material which comprises:

providing a III-V semiconductor material;

providing a means for implanting ions into the semiconductor material with the means for implanting having an

ionization chamber for ionizing materials, and also having a means for emitting ions of a predetermined type from the ionization chamber;

providing a beryllium cathode in the ionization chamber;

releasing a boron trifluoride gas into the ionization chamber;

ionizing the boron trifluoride gas for the purpose of sputtering beryllium from the ceryllium cathode and producing at least beryllium fluoride ions (BeF^+) in the ionization chamber;

emitting the beryllium fluoride ions from the means for implanting into the III-V semiconductor material; and

separating the beryllium fluoride ions into beryllium and fluorine that penetrate into the semiconductor material.

5,073,508

METHOD OF MANUFACTURING AN INTEGRATED SEMICONDUCTOR CIRCUIT INCLUDING A BIPOLAR HETEROJUNCTION TRANSISTOR AND/OR BURIED RESISTORS

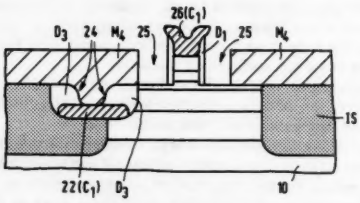
Claudine Villalon, Chennevieres-sur-Marne, France, assignor to U.S. Philips Corporation, Tarrytown, N.Y.

Filed Sep. 14, 1990, Ser. No. 583,270

Claims priority, application France, Sep. 21, 1989, 89 12405

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—31 **15 Claims**



1. A method of manufacturing a semiconductor integrated circuit including at least one heterojunction bipolar transistor (HBT), said method comprising the steps of

(a) forming on a substrate of semiconductor material in sequence at least one first semiconductor layer of a first conductivity type, at least one second semiconductor layer of a second conductivity type, and at least one third semiconductor layer of said first conductivity type, wherein p-n junctions are formed between said first and second semiconductor layers and between said second and third semiconductor layers, and wherein at least one of said p-n junctions is a heterojunction;

(b) forming a first mask on said third semiconductor layer, said first mask having at least two openings;

(c) etching said third semiconductor layer as far as said second semiconductor layer through said first mask to produce a relief structure having a height y_1, said relief having said third semiconductor layer for an emitter;

(d) forming a first uniform dielectric layer having a first opening at a surface of said relief;

(e) forming a second mask over said first uniform dielectric layer including said first opening and forming at least one second opening in said second mask, said second opening being laterally separated from said relief;

(f) etching as far as said first semiconductor layer through said second opening to form at least one cavity, said cavity having a transverse dimension x_1, where $y_1 < x_1/2$, said first semiconductor layer becoming a collector;

(g) removing remaining portions of said second mask, and removing any remaining portions of said first mask from said relief;

(h) forming first metallic contact layers for said emitter in said first opening and said collector in said second opening;

(j) forming a uniform second dielectric layer to a thickness y_2, where $y_1 < y_2 < x_1/2$, said second dielectric layer being a material etched at a same rate as said first dielectric layer;

(k) forming a planarizing layer on said second dielectric layer, and planarizing as far as said first dielectric layer;

(l) etching remaining portions of said planarizing layer, said second dielectric layer and said first dielectric layer as far as said second semiconductor layer, said planarizing layer being etched at a rate higher than an etching rate of said first and second dielectric layers, wherein side edges of said emitter remain covered by said first dielectric layer, and wherein remaining edges of said cavity remain covered by said second dielectric layer;

(m) forming a third mask having a third opening self-aligned about said emitter; said third opening exposing said second semiconductor layer, said second semiconductor layer becoming a base; and

(n) forming second metallic contact layers for said base in said third opening.

5,073,509

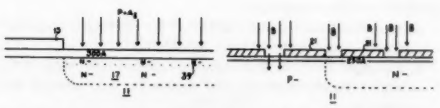
BLANKET CMOS CHANNEL-STOP IMPLANT

Ruojia R. Lee, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Dec. 11, 1989, Ser. No. 450,445

Int. Cl.[5] H01L *21/335*

U.S. Cl. 437—34 **10 Claims**



1. Method of fabricating transistor circuits having complimentary p-channel and n-channel transistors, in which n-wells are formed in a semiconductor wafer in areas at which p-type transistors are formed, the n-wells being defined by implanting the wafer with conductive impurities sufficiently to define the n-wells, and areas of the wafer outside of the n-wells being p areas, characterized by:

a) applying a supplemental dopant implant material to the n-wells as n-type conductive impurity, the supplemental implant material having a diffusion coefficient which is less than that of the implant material used to define the n-wells;

b) applying a p-type impurity to the wafer in a maskless implant step which is sufficient to result in p+ areas being formed outside of the n-wells, but insufficient to overcome the dopant effects within the n wells of the supplemental implant, thereby resulting in the n-wells remaining as n-type material, as a result of the supplemental implant;

c) growing field oxide areas on the p areas.

5,073,510

FABRICATION METHOD OF CONTACT WINDOW IN SEMICONDUCTOR DEVICE

Oh-Hyun Kwon; Taek-Yong Jang; Jung-Hyun Shin, and Won-Taek Choi, all of Seoul, Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suweon, Rep. of Korea

Filed Oct. 23, 1990, Ser. No. 602,464

Claims priority, application Rep. of Korea, Jul. 30, 1990, 90-11615

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—40 **13 Claims**

1. A fabrication method of contact windows in semiconductor devices, comprising the steps of:

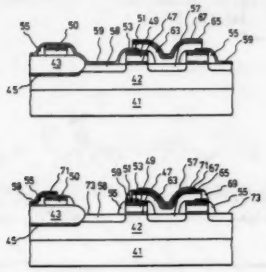
(a) defining a switching transistor region on a semiconductor substrate by forming a field oxide layer at a predetermined portion;

(b) forming a gate oxide layer, a polysilicon layer, a protec-

tive oxide layer, and an etching-stop layer sequentially on said transistor region and said field oxide layer;

(c) forming spacers at side walls of said polysilicon layer;

(d) forming a conductive diffusion region of a conductivity type different from that of said semiconductor substrate in the switching transistor region;



(e) thereafter depositing an oxide layer over the entire surface including said diffusion region and said etching-stop layer; and

(f) etching said oxide layer on said diffusion region to provide a window through said oxide layer overlying said diffusion region while said etching-stop layer is in place.

5,073,511

METHOD FOR MANUFACTURING A CONDUCTIVITY MODULATION MOS SEMICONDUCTOR POWER DEVICE (HIMOS)

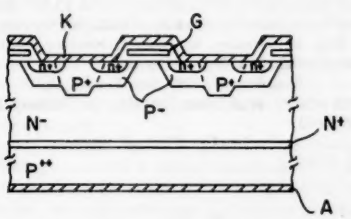
Salvatore Musumeci, Riposto, and Cesare Ronsisvalle, Catania, both of Italy, assignors to SGS-Thomson Microelectronics S.r.L., Milan, Italy

Filed Mar. 29, 1989, Ser. No. 330,182

Claims priority, application Italy, Mar. 29, 1988, 20005 A/88

Int. Cl.[5] H01L *21/336*

U.S. Cl. 437—40 **4 Claims**



1. A method for manufacturing a P-channel conductivity modulation MOS semiconductor power device in which the conductivity of the drain region is modulated by the injection of minority carriers of an N-P junction in series with the drain, said junction comprising an N+ type semicondutor substrate over which lies in sequence an P+ type thin buffer and an P— type epitaxial layer, wherein the formation of said buffer layer comprises the following steps in sequence:

epitaxially growing a thin N type semiconductor layer on said semiconductor substrate;

ion implanting or depositing P type dopant in said thin semiconductor layer;

diffusing said dopant at a sufficient temperature and for a sufficient length of time of form a P+ layer; and

epitaxially growing said P— type epitaxial layer.

5,073,512

METHOD OF MANUFACTURING INSULATED GATE FIELD EFFECT TRANSISTOR HAVING A HIGH IMPURITY DENSITY REGION BENEATH THE CHANNEL REGION

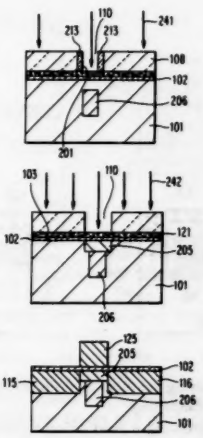
Akira Yoshino, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,291

Claims priority, application Japan, Apr. 21, 1989, 1-102452; Jun. 23, 1989, 1-161691

Int. Cl.[5] H01L *21/266*

U.S. Cl. 437—41 **6 Claims**



1. A method of manufacturing an insulated gate field effect transistor, comprising the steps of:

forming a thin insulating film on a major surface of a semiconductor substrate of a first conductivity type to form a gate insulating film;

forming a thin first polycrystalline silicon film on said insulating film;

forming a mask layer on said first polycrystalline silicon film and forming an opening in said mask layer;

ion-implanting said substrate with impurities of said first conductivity type through said insulating film using said mask layer as a mask to form a first impurity region of said first conductivity type and having a high impurity density in said substrate beneath said opening;

forming continuously a conductive film within said opening so as to fill said opening and on an upper surface of said mask layer;

removing said conductive film except a portion within said opening to expose an upper surface of said mask layer and to leave within said opening;

removing said mask layer entirely;

etching away selectively said first polycrystalline silicone film except a portion thereof beneath said conductive film pattern having configuration determined by said opening to form a gate electrode by said remaining portion of said first polycrystalline silicon film and said conductive film pattern;

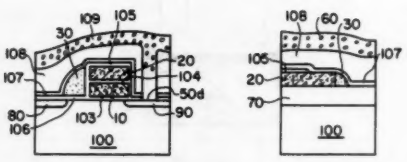
implanting impurities of a second conductivity type opposite to said first conductivity type in said semiconductor substrate using said gate electrode as a mask to form source and drain regions of said second conductivity type in said semiconductor substrate; and

wherein said first impurity region is formed by said ion implantation of said first conductivity type with side walls being left on side faces of said opening of said mask layer.

5,073,513
MANUFACTURE OF A NONVOLATILE SEMICONDUCTOR MEMORY DEVICE HAVING A SIDEWALL SELECT GATE

Soo-Cheol Lee, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea

Division of Ser. No. 412,305, Sep. 25, 1989, Pat. No. 5,041,886.
This application Mar. 20, 1991, Ser. No. 672,575
Claims priority, application Rep. of Korea, Aug. 17, 1989, 89-11731
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—43 17 Claims



1. A manufacturing method of nonvolatile semiconductor memory device comprising:

a first step of growing a field oxide layer on a silicon substrate through selective oxidation by applying an active mask, to define an active region;

a second step of growing a first gate oxide film, and then forming a first gate conductor layer on said active region;

a third step of covering said first gate conductor layer with a first intermediate insulating layer, then forming a second gate conductor layer over said first gate conductor layer and said field oxide layer and then covering the second conductor layer with a second intermediate insulating layer;

a fourth step of etching said second intermediate insulating layer, second gate conductor layer, first intermediate insulating layer and said first gate conductor layer by applying a self-aligned mask, to define a word line;

a fifth step of growing a second gate oxide film on the etched portion of said fourth step, and etching said second intermediate insulating layer by applying a gate contact mask to form a gate contact hole;

a sixth step of forming a third gate conductor layer along both side walls of said first and second gate conductor layer, as a side wall spacer structure through the application etch back process;

a seventh step of removing a portion of said side wall spacer structure;

an eighth step of doping selectively an impurity having a conductivity type different from that of said silicon substrate into said active region to form a drain region and a source region;

said removed portion of the side wall spacer structure being otherwise located above a drain region on the substrate;

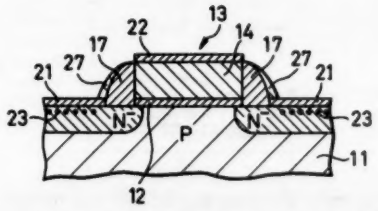
a ninth step of forming at least another intermediate insulating layer after said eighth step, and then etching said at least another intermediate insulating layer by applying a metal contact mask to form a metal contact hole; and

a tenth step of forming metal wiring by applying a metallic mask to define bit lines and common source lines.

5,073,514
METHOD OF MANUFACTURING MIS SEMICONDUCTOR DEVICE

Shinichi Ito; Naoya Noshi, both of Kanagawa, and Yutaka Okamoto, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 17, 1990, Ser. No. 553,393
Claims priority, application Japan, Jul. 18, 1989, 1-185759
Int. Cl.[5] H01L *21/265, 21/336*
U.S. Cl. 437—44 5 Claims

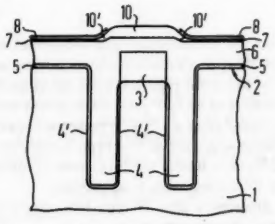


1. A method of manufacturing a MIS semiconductor device, comprising the steps of: forming a gate electrode on a gate insulating film on a semiconductor substrate; forming a first impurity region having a relatively low impurity concentration in said semiconductor substrate using said gate electrode as a mask; forming side walls from a first SiO_2 layer on said gate electrode; forming an insulating film formed from a second SiO_2 layer on at least a surface of said semiconductor substrate, said side walls and said gate electrode; oxidizing at least said surface of said semiconductor substrate; forming a second impurity region having a relatively high impurity concentration in said semiconductor substrate using said gate electrode and said side walls as masks, and wherein a thickness of said insulating film falls within a range of 100 to 300 Å and wherein said insulating film is in place over the substrate surface, side walls and gate electrode during the step of forming the second impurity region.

5,073,515
METHOD FOR MANUFACTURING A TRENCH CAPACITOR OF A ONE-TRANSISTOR MEMORY CELL IN A SEMICONDUCTOR SUBSTRATE WITH A SELF-ALIGNED CAPACITOR PLATE ELECTRODE

Siegfried Roehl, Sauerlach, and Josef Mathuni, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 27, 1990, Ser. No. 572,262
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1989, 3932683
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—52 33 Claims



1. Method for manufacturing a trench capacitor of a one-transistor memory cell in a semiconductor substrate, comprising the steps of:

forming a trench overlapping with a field oxide that isolates various cells and forming a first capacitor electrode of the trench capacitor, manufacturing a first layer on a surface

of the semiconductor substrate and on a surface of the first capacitor electrode;

applying a second layer on the first layer and on the field oxide, and applying at least a third layer on the second layer and applying a leveling auxiliary layer on the at least third layer;

removing the auxiliary layer at least until parts of at least the third layer are exposed, removing the exposed parts of the at least third layer at least until parts of the surface of the second layer are exposed;

completely removing the auxiliary layer to produce a sacrificial layer at least on the exposed part of the surface of the second layer;

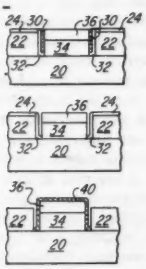
completely removing the all remaining layers still situated on the surface of the second layer with the exception of the sacrificial layer, and structuring the second layer using the sacrificial layer as a mask to form a capacitor plate electrode of the trench capacitor.

5,073,516

SELECTIVE EPITAXIAL GROWTH PROCESS FLOW FOR SEMICONDUCTOR TECHNOLOGIES

Mehrdad M. Moslehi, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 28, 1991, Ser. No. 662,078
Int. Cl.[5] H01L *21/20*
U.S. Cl. 437—89 **31 Claims**



1. A method of fabricating a semiconductor device, wherein said method comprises:

a. forming a first insulating structure on a substrate;

b. patterning and etching said first insulating layer to expose a portion of said substrate and sidewalls of said first insulating structure;

c. forming a second insulating structure comprising a top insulating layer and a bottom insulating layer on said patterned first insulating structure, along said sidewalls of said first insulating structure, and on said exposed substrate;

d. anisotropically removing portions of said second insulating structure leaving a sidewall region of said second insulating material along said sidewall of said first insulating structure and a region of said second insulating structure on a portion of said exposed substrate, and exposing a portion of said exposed substrate;

e. selectively forming a region of semiconducting material encompassed by said second insulating structure and said exposed region of said substrate;

f. etching said second insulating sidewall region to substantially expose said sidewalls of said semiconducting region and top of said semiconducting region; and

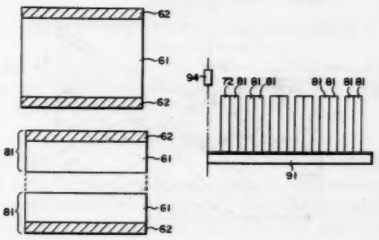
g. forming a third insulating layer on said exposed semiconducting region and on said exposed sidewalls of said semiconducting region.

5,073,517

DOPANT FILM AND METHODS OF DIFFUSING IMPURITY INTO AND MANUFACTURING A SEMICONDUCTOR WAFER

Masaburo Iwabuchi, Yokohama; Hideyoshi Ito, Hyogo, and Kenji Unetsubo, Tatsuno, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 263,202, Oct. 27, 1988, Pat. No. 5,024,867. This application Oct. 18, 1990, Ser. No. 600,584
Claims priority, application Japan, Oct. 28, 1987, 62-272114; Jul. 14, 1988, 63-173714
Int. Cl.[5] H01L *21/22*
U.S. Cl. 437—153 **5 Claims**



1. A method of manufacturing a semiconductor substrate comprising the steps of:

diffusing an impurity into both major surfaces of a semiconductor wafer to form diffusion layers;

dividing said semiconductor wafer into two wafers in the direction of thickness thereof; and

polishing surfaces of said two wafers divided that are opposite to said diffusion layers to a mirror surface.

5,073,518

PROCESS TO MECHANICALLY AND PLASTICALLY DEFORM SOLID DUCTILE METAL TO FILL CONTACTS OF CONDUCTIVE CHANNELS WITH DUCTILE METAL AND PROCESS FOR DRY POLISHING EXCESS METAL FROM A SEMICONDUCTOR WAFER

Trung Doan; Mark E. Tuttle, and Tyler A. Lowrey, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Continuation-in-part of Ser. No. 595,540, Oct. 11, 1990, abandoned, Ser. No. 510,535, Apr. 18, 1990, abandoned, and Ser. No. 441,611, Nov. 27, 1989, abandoned, said Ser. No. 595,540, and Ser. No. 510,535, each is a continuation-in-pa.t of Ser. No. 441,611,. This application Jun. 20, 1991, Ser. No. 718,206
Int. Cl.[5] H01L *21/44*
U.S. Cl. 437—180 **49 Claims**

1. A method of forming a conductive path of ductile metal within an exposed, planarized dielectric layer of an integrated circuit comprising the following sequential steps:

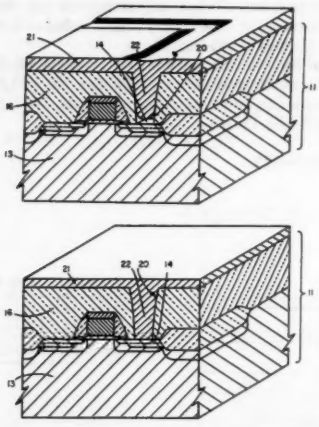
masking the dielectric layer with a photoresist mask in order to define a geometry of a conductive path;

etching the dielectric layer in order to create a depression within the dielectric layer;

removing the photoresist mask;

depositing a ductile metal to provide a ductile, solid, unitary integral mass metal layer on top of the dielectric layer, the solid metal layer incompletely filling the depression; and

plastically deforming the solid metal layer through an input of mechanical energy in order to ductilely force the duc-



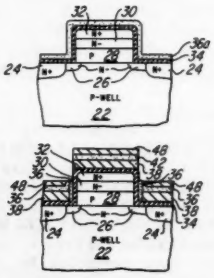
tile metal from the ductile metal layer more completely into the depression.

5,073,519

METHOD OF FABRICATING A VERTICAL FET DEVICE WITH LOW GATE TO DRAIN OVERLAP CAPACITANCE

Mark S. Rodder, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 31, 1990, Ser. No. 607,011
Int. Cl.[5] H01L *21/28, 21/336*
U.S. Cl. 437—180 **5 Claims**



1. A method of forming a vertical MOSFET device on a semiconductor substrate, the device having a pillar on the substrate, with the pillar having a channel region in a lower portion and with the channel region having a top and a highly doped first source/drain region in an upper portion of the pillar, and with the substrate having a highly doped second source/drain region and with a gate insulator on the substrate and on the pillar; said method comprising:

a. isotropically forming a gate electrode material layer on said pillar and said substrate;

b. anisotropically depositing a gate height determining insulator material on horizontal surfaces to at least the top of said channel region but not substantially overlapping said first highly doped source/drain region; and

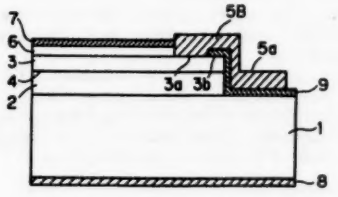
c. etching exposed gate electrode material to remove exposed gate electrode material above said gate height determining insulator material.

5,073,520

METHOD OF MAKING A SEMICONDUCTOR DEVICE

Susumu Yoshida, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 186,237, Apr. 26, 1988, Pat. No. 4,918,507.
This application Jan. 18, 1990, Ser. No. 466,915
Claims priority, application Japan, May 8, 1987, 62-112915
Int. Cl.[5] H01L *21/60, 21/302*
U.S. Cl. 437—184 **3 Claims**



1. A method of manufacturing a semiconductor device, comprising the steps of:

preparing a semiconductor substrate of a first conductivity type;

forming a first semiconductor layer of the first conductivity type on a surface of the semiconductor substrate;

forming a second semiconductor layer of a second conductivity type on said first semiconductor layer;

selectively etching said first and second semiconductor layers to partially expose the surface of said semiconductor substrate;

forming an insulating film over a surface region from said exposed surface of said semiconductor substrate to a part of a surface of said second semiconductor layer;

forming a first electrode over said insulating film and another part of the surface of said second semiconductor layer, said first electrode being electronically connected with said second semiconductor layer on said another part, a region of said first electrode on said insulating film on said semiconductor substrate serving as a region to be connected with an external terminal, and being a comb-type electrode structure having grid electrode extensions formed on said second semiconductor layer and said first electrode further including a bar electrode section formed on both said second semiconductor layer and said insulating film; and

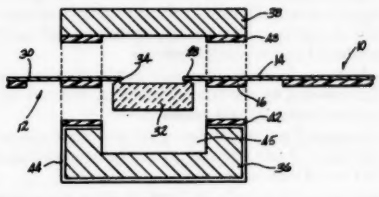
forming a second electrode on a back surface of said semiconductor substrate.

5,073,521

METHOD FOR HOUSING A TAPE-BONDED ELECTRONIC DEVICE AND THE PACKAGE EMPLOYED

Jeffrey S. Braden, Milpitas, Calif., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 15, 1989, Ser. No. 436,854
Int. Cl.[5] H01L *21/60*
U.S. Cl. 437—209 **17 Claims**



1. A method for assembling a package to house an electronic device, comprising the steps of:

providing an electrically conductive interconnect tape having a plurality of leads, each said lead having an inner lead portion extending in cantilever fashion about a centrally positioned aperture and an outer lead portion;

electrically connecting each said inner lead portion to an input/output site on said electronic device;

disposing said bonded electronic device and interconnect tape between base and cover components such that at least a portion of each said outer lead portion extends beyond said base component and said cover component; and

simultaneously bonding by adhesively sealing both said base component and said cover component to said interconnect tape thereby encapsulating said electronic device.

5,073,522

Patent Not Issued For This Number

5,073,523

DIELECTRIC CERAMIC COMPOSITION

Masayuki Yamada, Takefu; Hiroaki Ichikawa, Yokohama; Tadashi Morimoto, Takefu; Yasuyuki Naito, both of Takefu; Hiroshi Takagi, Otsu; Harufumi Mandai, Takatsuki, and Yukio Sakabe, Kyoto, all of Japan, assignors to Murata Mfg. Co., Japan

Filed Sep. 6, 1990, Ser. No. 578,629

Claims priority, application Japan, Sep. 7, 1989, 1-234388

Int. Cl.[5] C03C *14/00;* **C04B** *35/49*

U.S. Cl. 501—32 **1 Claim**

1. A dielectric ceramic composition consisting essentially of 80 to 99.7 wt % of a main component of a system $SrTiO_3$-$PbTiO_3$-$CaTiO_3$-Bi_2O_3-TiO_2-SnO_2, 0.1 to 5.0 wt % of at least one oxide of rare earth elements in terms of Re_2O_3, where Re is at least one rare earth element selected from the group consisting of Nd, La, Ce, Pr and Sm, and 0.2 to 15 wt % of a vitreous component,

said main component consisting essentially, by weight, of 20.0 to 50.0% of $SrTiO_3$, 8.0 to 37.6% of Pb-TiO_3, 3.2 to 33.9% of $CaTiO_3$, 4.4 to 35.2% of Bi_2O_3, 2.5 to 13.6% of TiO_2, and 0.2 to 12.0% of SnO_2,

said vitreous component consisting essentially of 10 to 45 mol % of Li_2O, 5 to 40 mol % of at least one oxide selected from the group consisting of BaO, MgO, CaO and SrO, 0.2 to 10 mol % of Al_2O_3, 30 to 70 mol % of at least two oxides selected from the group consisting of SiO_2, MnO_2 and TiO_2, and 1 to 35 mol % of CuO, the content of SiO_2 in the vitreous component being not less than 15 mol % at the least.

5,073,524

RADIATION-SHIELDING GLASSES PROVIDING SAFETY AGAINST ELECTRICAL DISCHARGE AND BEING RESISTANT TO DISCOLORATION

Burkhard Speit, Mainz-Finthem, Fed. Rep. of Germany, assignor to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 341,996, Apr. 24, 1989, abandoned, which is a continuation-in-part of Ser. No. 342,670, Apr. 2, 1989, abandoned, which is a continuation-in-part of Ser. No. 111,339, Oct. 22, 1987, abandoned. This application Jun. 6, 1990, Ser. No. 534,012

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 3635834

Int. Cl.[5] C03C *3/102*

U.S. Cl. 501—60 **34 Claims**

1. Radiation-shielding glasses absorbing gamma and X-ray radiation and neutron radiation with a resistance to electrical discharge of $>5\times10^8$ rad with respect to high-energy radiation in the glass system (quantitative data in % by weight) of:

SiO_2	35–56	
PbO	24–46	
Li_2O	0–2.5	
Na_2O	0–4	
K_2O	15.1–21	Σ = 15.1–21
Cs_2O	0–5	

-continued

CeO_2	0.5–2.5	
CuO	0–0.05	
Fe_2O_3		

and SiO_2 being replaced in the glasses in an amount of 2–10% by weight of the sum of B_2O_3 and Gd_2O_3, with the provisions that at least 35% of SiO_2 is present in the glass, and Gd_2O_3 is present in an amount effective to contribute to said resistance.

5,073,525

LIGHTWEIGHT TUNDISH REFRACTORY COMPOSITION

Jung-Jen A. Cheng, Easton, Pa.; Wilfred A. Martinez, Annandale, and Amy P. Hale, Glen Gardner, both of N.J., assignors to Quigley Company, Inc., New York, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,633

Int. Cl.[5] C04B *38/06, 35/02, 35/14*

U.S. Cl. 501—81 **27 Claims**

1. A refractory composition comprising a refractory aggregate material selected from the group consisting of magnesia, alumina, calcia, silica and combinations thereof, and amounts of styrofoam beads and paper fiber in combination, such that the amounts of styrofoam beads and paper fiber are effective to respectively produce a homogeneous distribution of substantially spheroidal voids and interconnecting channels in the composition for the selected refractory aggregate material; with the voids and channels having a size which eliminates the occurrence of explosive spalling in the composition when it is heated to temperatures above the boiling point of water and the combustion temperatures of said styrofoam beads and paper fiber; the occurrence of explosive spalling being eliminated by allowing steam generated from water utilized in the mixing of the composition for application to a surface, and gases generated by the combustion of said styrofoam beads and paper fiber during said heating, which causes the formation of said voids and channels, to escape from the composition through said voids and channels, while not allowing the ingress of any external material with which the refractory composition is in contact.

5,073,526

ELECTRONIC PACKAGE COMPRISING ALUMINUM NITRIDE AND ALUMINUM NITRIDE-BOROSILICATE GLASS COMPOSITE

Jack H. Enloe, Columbia; John W. Lau, Gaithersburg, both of Md., and Roy W. Rice, Alexandria, Va., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Division of Ser. No. 7,286,557, Dec. 19, 1988, Pat. No. 5,017,434, which is a continuation-in-part of Ser. No. 7,148,829, Jan. 27, 1988, Pat. No. 4,920,640. This application Aug. 1, 1990, Ser. No. 544,437

Int. Cl.[5] C04B *35/58*

U.S. Cl. 501—96 **13 Claims**

1. A process for making an electronic package comprising

(a) hot pressing a greenware laminate comprising:

(1) an AlN base;

(2) at last one green sinterable sheet; and

(3) a green sheet of nonsinterable material; said green sinterable sheet consisting essentially of a homogeneous mixture of finely divided AlN and borosilicate glass particles and a binder; said green sheet of nonsinterable material consisting essentially of a homogeneous mixture of finely divided nonsinterable BN particles and a binder; and

(b) removing the nonsinterable material.

5,073,527
SELF-SUPPORTING CERAMIC MATERIALS

Marc S. Newkirk, Newark, Del., and Harry R. Zwicker, Elkton, Md., assignors to Lanxide Technology Company, LP, Newark, Del.

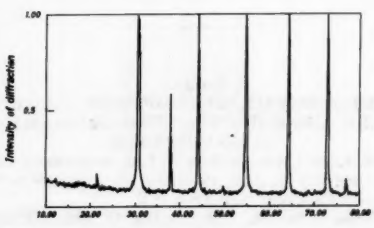
Continuation of Ser. No. 256,256, Oct. 11, 1988, abandoned, which is a continuation of Ser. No. 50,829, May 15, 1987, abandoned, which is a division of Ser. No. 822,999, Jan. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 776,965, Sep. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 747,788, Jun. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 632,636, Jul. 20, 1984, abandoned. This application Mar. 28, 1990, Ser. No. 462,329
Int. Cl.[5] C04B *35/10*
U.S. Cl. 501—127 3 Claims

2. A self-supporting ceramic body comprising a three-dimensionally interconnected ceramic matrix consisting essentially of α-alumina and comprising about 65–85 volume percent of said ceramic body, and said ceramic matrix displaying a columnar macrostructure having a substantially hexagonal cellular pattern, said cellular pattern boundaries being substantially normal to the vertical axis of the columnar macrostructure, and a three-dimensionally interconnected metallic phase comprised predominantly of aluminum, said metallic phase comprising about 15–35 volume percent of said ceramic body, said ceramic body being integrally attached to a growth installation surface comprising magnesium aluminate spinel, said grow initiation surface being located at least on one surface of said self-supporting ceramic body.

5,073,528
DIELECTRIC CERAMIC AND PROCESS FOR PRODUCING THE SAME

Kazutoshi Matsumoto, Matsudo; Takehiro Hyuga, Ishikawa, and Tetsuya Mukai, Matsudo all of Japan, assignors to Sumitomo Metal Mining Co., Ltd., Tokyo, Japan

Filed May 30, 1990, Ser. No. 530,213
Claims priority, application Japan, May 30, 1989, 1-136679
Int. Cl.[5] C04B *35/46, 35/48, 35/49*
U.S. Cl. 501—134 6 Claims



1. A dielectric ceramic essentially consisting of a compound having a disordered perovskite-type complex crystal structure and having a composition represented by the general formula (I):

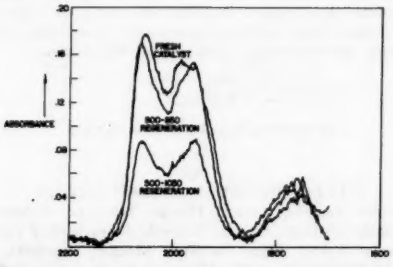
$$Ba_xA_yB_{1-x-y}O_w \quad (I)$$

wherein A represents at least one element selected from the group consisting of Zn, Ni, Co and Mg, and the Mg content in the A is not more than 0.44y; B is at least one element selected from the group consisting of Ta and Nb; x and y are a number of $0.49 \leqq x \leqq 0.52$ and $0.15 \leqq y \leqq 0.19$, respectively; w is a number that neutralizes the total electric charge of cations Ba, A and B so that the ceramic may be neutral electrically as a whole.

5,073,529
METHOD OF REGENERATING A NONACIDIC ZEOLITE CATALYST

Jeffrey T. Miller; Frank S. Modica, both of Naperville, Ill.; Sandra L. Cilluffo, Lafayette, Ind., and Victor K. Shum, Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 20, 1989, Ser. No. 453,666
Int. Cl.[5] B01J *29/38, 23/96, 38/20;* C10G *35/095*
U.S. Cl. 502—49 1 Claim



1. A halogen-free oxidation process for regenerating a sulfur-free, platinum, nonacidic L zeolite catalyst, a substantial portion of active platinum surface area positioned within micropores of said L zeolite, said catalyst having been deactivated by deposition of a carbonaceous material as a result of previous contact of said catalyst with a hydrocarbon feedstock comprising C_6–C_8 nonaromatic hydrocarbon in the presence of hydrogen under reforming conditions, said process producing a carbon dioxide-containing regeneration effluent, comprising the steps of:

(a) contacting said catalyst with a gaseous stream consisting essentially of oxygen and nitrogen and having a halogen concentration less than about 10 ppm at a first temperature sufficient to combust the carbonaceous material and ranging from about 500–700 deg. F. while maintaining greater than about 80% of said active platinum surface area within said micropores of said L zeolite;

(b) monitoring carbon dioxide concentration of said regeneration effluent and continuing to combust said carbonaceous material for a first period of time sufficient for said carbon dioxide concentration of level off, said first period being about 3 to 72 hr; and

(c) contacting said catalyst with a gaseous stream consisting essentially of oxygen and nitrogen and having a halogen concentration less than about 10 ppm at a higher second temperature and for a second period time sufficient to combust greater than 80% of said carbonaceous material while maintaining at least 80% of said active platinum surface area within said micropores of said L zeolite, said second temperature ranging from about 850–950 deg. F., said second period of time ranging from about 0.5 to 10 hr.

5,073,530
HYDROCRACKING CATALYST AND PROCESS

Richard D. Bezman, Port Richmond, and Dennis R. Cash, Novato, both of Calif., assignors to Chevron Research and Technology Company, San Francisco, Calif.

Filed May 10, 1989, Ser. No. 349,758
Int. Cl.[5] B01J *29/12*
U.S. Cl. 502—65 14 Claims

1. A catalyst comprising an inorganic oxide component, a zeolite component and-a hydrogenation component wherein the zeolite component has a number average crystal size of less than about 0.5 micron.

3. A catalyst according to claim 1 wherein the hydrogenation component is a metal comprising palladium.

5. A catalyst according to claim 1 wherein the inorganic oxide component comprises alumina.

5,073,531

OLEFIN POLYMERIZATION CATALYSTS AND PREPARATION METHOD

Donald R. Witt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 7, 1990, Ser. No. 520,372
Int. Cl.[5] C08F 4/64
U.S. Cl. 502—228 23 Claims

1. An improved method of preparing a gelled sodium free, large pore polymerization catalyst comprising:

combining a hydrolyzable silicate ester and a hydrolyzable acid-generating transition metal compound with water and an organic solvent whereby a hydrolysis reaction solution is formed comprising silica and transition metal, said transition metal being present in said solution in an amount sufficient when said solution is gelled to produce a silica-transition metal catalyst containing from about 0.1% to about 2% by weight transition metal;

adding sufficient acid-neutralizing agent to said solution without stirring or agitating said solution to form a gelled silica-transition metal catalyst;

aging said catalyst to develop and stabilize a large pore silica-transition metal gel structure;

separating water and organic solvent from said catalyst; and

activating said large pore gel structure catalyst by subjecting it to a calcination process.

5,073,532

CATALYST FOR PURIFYING EXHAUST GASES FROM INTERNAL COMBUSTION ENGINES AND METHOD OF MAKING THE CATALYST

Rainer Domesle, Maintal; Bernd Engler, Hanau; Edgar Koberstein, Alzenau, and Peter Schubert, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 303,287, Jan. 30, 1990, abandoned. This application Jul. 30, 1990, Ser. No. 559,095
Claims priority, application Fed. Rep. of Germany, Feb. 3, 1988, 3803122
Int. Cl.[5] B01J 21/04, 21/06, 23/10, 23/40
U.S. Cl. 502—304 18 Claims

1. A method of making a catalyst for the purification of exhaust gases from internal combustion engines comprising forming a support by impregnating aluminum oxide from the transition series with an aqueous solution of a cerium salt and a zirconium salt and optionally an iron salt and/or a nickel salt, or impregnating with an aqueous suspension of oxides, hydroxides, or carbonates of cerium, zirconium, and optionally iron and/or nickel; tempering the support by heating in air at a temperature from 500 to 900°, impregnating the support with an aqueous solution of a salt or a noble metal and a base metal wherein the noble metal is platinum, palladium or rhodium or mixtures thereof and the base metal is cerium, the amount of noble metal component being from 0.03 to 3 weight percent and the amount of cerium being 0.01 to 150% by weight based on the total weight of the noble metal and cerium in the form of cerium oxide being an amount from 0.0007 to 0.35 gram per liter of carrier volume, contacting the so impregnated support with a hydrogen gas stream at a temperature from 250 to 650° C. and thereby forming the carrier catalyst.

2. A catalyst for purifying exhaust gases from internal combustion engines comprising a support composed of aluminum oxide from the transition series, which contains 5 to 70 weight % CeO_2 and 1.6 to 1.9 weight % ZrO_2, 1 to 10 weight % Fe_2O_3, and 0 to 20 weight % NiO_2, and a catalytically active phase deposited on the support, said phase consisting of 0.03 to 3 weight % of a noble metal selected from the group of platinum, palladium and rhodium or mixtures thereof, in combination with a base metal, cerium, the amount of cerium being 0.01 to 150% by weight, based on the total weight of noble metal and cerium in the form of cerium oxide being an amount from 0.0007 to 0.35 gram per liter of carrier volume; said catalyst produced by the method of claim 1.

5,073,533

THERMAL TRANSFER IMAGE RECEIVING MATERIALS

Toshiaki Aono, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 12, 1989, Ser. No. 420,442
Claims priority, application Japan, Oct. 14, 1988, 63-258566
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 16 Claims

1. A thermal transfer image receiving material comprising a support having thereon at least one dye receiving layer which can accept a dye which migrates from a thermal transfer dye donating material as a result of heating, wherein said dye receiving layer comprises a water soluble binder having a dye accepting substance dispersed therein, and said water soluble binder is hardened by a hardening agent.

5,073,534

COLOR FILTER ARRAY ELEMENT WITH POLYESTER RECEIVING LAYER

Daniel J. Harrison, Pittsford; Helmut Weber, Webster, and Paul D. Yacobucci, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 30, 1991, Ser. No. 647,851
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 20 Claims

1. A thermally-transferred color filter array element comprising a transparent support having thereon a thermally-transferred image comprising a repeating pattern of colorants in a binder composed of one or more polyesters having a Tg greater than about 200° C. derived from one or more dibasic aromatic acids and one or more dihydroxyphenols that contain at least one large bulky central moiety.

5,073,535

METHOD OF SHAPING SUPERCONDUCTING OXIDE MATERIAL

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 252,591, Oct. 3, 1988, abandoned. This application Aug. 7, 1990, Ser. No. 564,681
Claims priority, application Japan, Oct. 7, 1987, 62-253177
Int. Cl.[5] H01B 12/00
U.S. Cl. 505—1 7 Claims

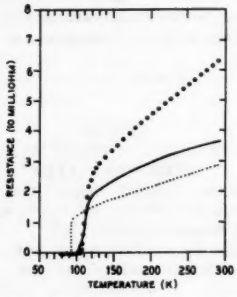
1. A method for forming an improved superconducting oxide material comprising the steps of placing a superconducting oxide material into a plasma generating chamber, and oxygen annealing the superconducting oxide material by subjecting it to an activated oxygen treatment in which one of oxygen and oxide gas is introduced and activated by converting it to plasma while simultaneously applying a magnetic field to said material to thereby increase the rate of said annealing step.

5,073,536

HIGH TEMPERATURE SUPERCONDUCTORS COMPRISING TL—CA—BA—O, TL—SR—BA—CU—O, OR TL—SR—CU—O

Zhengzhi Sheng, and Allen M. Herman, both of Fayetteville, Ark., assignors to The University of Arkansas, Little Rock, Ark.

Continuation of Ser. No. 155,247, Feb. 12, 1988, Pat. No. 4,962,083. This application Mar. 26, 1990, Ser. No. 498,392
The portion of the term of this patent subsequent to Oct. 9, 2005, has been disclaimed.
Int. Cl.[5] C01F *11/02*; C01G *3/02, 15/00*; H01L *39/12*
U.S. Cl. 505—1 3 Claims



1. A composition having superconductor properties comprising:

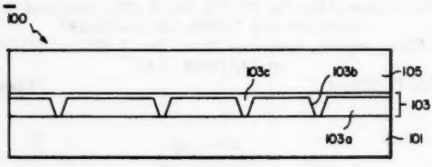
Tl—Ca—Ba—Cu—O.

5,073,537

ELECTRICALLY CONDUCTIVE ARTICLE

Liang-Sun Hung, Webster, and Dilip K. Chatterjee, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1990, Ser. No. 475,528
Int. Cl.[5] B32B *9/00*
U.S. Cl. 505—1 13 Claims



1. An article comprised of
a support,
a barrier and
an electrically conductive crystalline coating comprised of a heavy pnictide mixed alkaline earth copper oxide capable of crystallization to a 2-2-1-2 or 2-2-2-3 crystal structure at a temperature of 850° C. or less in a time period of 10 minutes or less,
characterized in that
the support is comprised of an austenitic alloy of chromium and one or more group VIII period 4 metals and
the barrier is comprised of a zirconia layer containing stress relief fissures created by heating the support and the zirconia layer to a temperature of at least 550° C.and located in the fissures an oxide compatible with crystallization of the heavy pnictide mixed alkaline earth copper oxide in an electrically conductive form chosen from among magnesia, hafnia, strontium titanate, lanthanum aluminate and potassium tantalate.

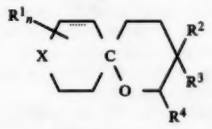
5,073,538

CYCLOALKYLIDENE DERIVATIVES AND FRAGRANCE COMPOSITION

Michael Heullmann, Heppenheim; Rainer Becker, Bad Duerkheim; Lothar Janitschke, Kleinniedesheim; Gerald Lauterbach, Bensheim; Wolfgang Barth, Wuppertal, and Klaas Jansen, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 24, 1990, Ser. No. 571,899
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1989, 3928242
Int. Cl.[5] A61K *7/46*; C07D *311/96*
U.S. Cl. 512—9 2 Claims

1. A cycloalkylidene derivative of the formula Ic



Ic

where the dashed line is an optional additional chemical bond, the radicals R^1 are identical or different C_1–C_4-alkyl or C_2–C_4-alkenyl groups, R^2 and R^3 are each methyl or ethyl, R^4 is hydrogen or one of the radicals R^1, X is methylene or a chemical bond, and n is from 0 to 3.

2. A fragrance composition which contains a cycloalkylidene derivative of the formula Ic as claimed in claim 1.

5,073,539

TRANSDERMAL ADMINISTRATION OF ZWITTERIONIC DRUGS

Gerard C. Mazzenga, New City, and Bret Berner, Scarsdale, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 22, 1990, Ser. No. 468,388
Int. Cl.[5] A61K *31/00*
U.S. Cl. 514—2 14 Claims

1. A transdermal device for the administration of a pharmaceutically acceptable zwitterionic active agent to an animal in need thereof comprising a resevoir for said active agent, said active agent in salt form in a transdermally effective amount, and a pharmaceutically acceptable carrier for said active agent, wherein said pharmaceutically acceptable zwitterionic active agent is selected from the group consisting of amino acids, baclofen, and ACE Inhibitors, said pharmaceutically acceptable zwitterionic active agent and said carrier being in said reservoir.

5,073,540

COMPOSITE BINDING SITE DRUGS

Lennart Olsson, Orinda, Calif., assignor to Receptron, Concord, Calif.

Filed May 15, 1989, Ser. No. 351,764
Int. Cl.[5] C07K *7/40*; A61K *37/26, 37/02*
U.S. Cl. 514—3 6 Claims

1. A composition of matter comprising a polypeptide sequence of a polymorphic region of a Class I major histocompatibility complex antigen, wherein said polypeptide sequence consists essentially of at least 8 amino acids in sequence of the sequence E-R-E-T-Q-I-A-K-G-N-E-Q-S-F-R-V-D-K-R-T-K-K-R-Y-Y, wherein said at least about 8 amino acid sequence has R-Y or R-Y-Y at the C-terminus and which binds to other than the ligand binding site of a mammalian naturally occurring surface membrane receptor, wherein aid receptor is for insulin or epidermal growth factor, wherein said binding results in a change in conformation of said receptor, said polypeptide sequence joined covalently to a compound which binds to the binding site of said receptor.

5,073,541

TREATMENT OF SMALL CELL LUNG CANCER WITH SOMATOSTATIN ANALOGS

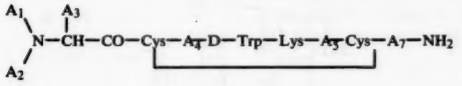
John E. Taylor, Upton; Arthur E. Bogden, Hopedale; Jacques-Pierre Moreau, Upton, all of Mass., and David H. Coy, New Orleans, La., assignors to Administrators of the Tulane Educational Fund, New Orleans, La. and Biomeasure, Inc., Hopkinton, Mass.

Continuation-in-part of Ser. No. 121,937, Nov. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 70,400, Jul. 7, 1987, abandoned, which is a continuation-in-part of Ser. No. 10,349, Feb. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 875,266, Jun. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 775,488, Sep. 12, 1985, abandoned. This application Aug. 11, 1988, Ser. No. 231,136

Int. Cl.[5] A61K *37/02*; C07K *5/12, 7/26*

U.S. Cl. 514—9 12 Claims

1. A method of treating small cell lung cancer in a mammal comprising administering an effective amount of somatostatin analog of the formula:



wherein each A_1 and A_2, independently, is H, C_{1-12} alkyl, C_{7-10} phenylalkyl, R_1CO (where R_1 is C_{1-20} alkyl, C_{3-20} alkenyl, C_{3-20} alkynyl, phenyl, naphthyl, or C_{7-10} phenylalkyl), or R_2OCO (where R_2 is C_{1-10} alkyl or C_{7-10} phenylalkyl), provided that when one of A_1 or A_2 is R_1CO or R_2OCO, the other must be H; A_3 is CH_2-A_6 (where A_6 is pentafluorophenyl, napthyl, pyridyl, phenyl, or o-, m-, or p- substituted phenyl, where the substituent is a halogen, NH_2, NO_2, OH, or C_{1-3} alkyl); A_4 is o-, m-, or p-substituted X-Phe (where X is a halogen, H, NH_2, NO_2, OH or C_{1-3} alkyl), pentafluoro-Phe, or β-Nal; A_5 is Thr, Ser, Phe, Val, α-aminobutyric acid, or Ile, provided that when A_3 is phenyl, A_1 is H, and A_2 is H, A_5 cannot be Val; A_7 is Thr, Trp, or β-Nal; and all amino acid residues are linked via an amide bond; or a pharmaceutically acceptable salt thereof.

5,073,542

CPF PEPTIDE COMPOSITIONS AND THEIR USE IN INHIBITING GROWTH OF TARGET CELLS OR A VIRUS

Michael Zasloff, Merion Station, Pa., assignor to Magainin Sciences Inc., Plymouth Meeting, Pa.

Continuation-in-part of Ser. No. 362,689, Jun. 7, 1989, abandoned, which is a continuation-in-part of Ser. No. 260,861, Oct. 21, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 462,012

Int. Cl.[5] A61K *37/02*; C07K *7/10*

U.S. Cl. 514—12 15 Claims

1. A composition for inhibiting the growth of a target cell or virus, comprising:

a CPF peptide and a pharmaceutical carrier, said CPF peptide being present in an amount effective to inhibit growth of a target cell or virus, said CPF peptide having the following structure:

$$(Y)_a\text{—}X\text{—}(Z)_b$$

wherein X has the following structure:

$$R_1\text{—}R_1\text{—}R_2\text{—}R_2\text{—}R_1\text{—}R_1\text{—}R_3\text{—}R_1\text{—}R_1\text{—}R\text{-}1\text{—}R_3\text{—}R_1\text{—}R_1\text{—}R_4\text{—}R_5\text{—}R_1,$$

Y is:

(i) R_5;

(ii) R_2—R_5;

(iii) R_1—R_2—R_5; or

(iv) R_2—R_1—R_2—R_5, and

Z is:

(i) R_1;

(ii) R_1—R_1;

(iii) R_1—R_1—R_4;

(iv) R_1—R_1—R_4—R_4;

(v) R_1—R_1—R_4—R_4—R_6;

(vi) R_1—R_1—R_4—R_4—R_6—Gln; or

(vii) R_1—R_1—R_4—R_4—R_6—Gln—Gln, wherein

R_1 is a hydrophobic amino acid;

R_2 is a basic hydrophilic amino acid or a hydrophobic amino acid; R_3 is a basic hydrophilic amino acid; R_4 is a hydrophobic or neutral hydrophilic amino acid; R_5 is a basic hydrophilic or neutral hydrophilic amino acid; R_6 is proline or a hydrophobic amino acid, a is 0 or 1, and b is 0 or 1.

5,073,543

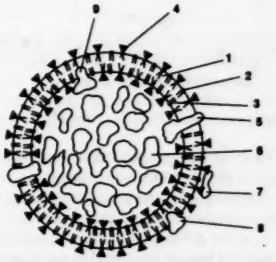
CONTROLLED RELEASE FORMULATIONS OF TROPHIC FACTORS IN GANGLIOSIDE-LIPSOME VEHICLE

Lucia G. I. Marshall, St. Charles; Kanaiyalal R. Patel, and Dikla G. Roufa, both of St. Louis, all of Mo., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jul. 21, 1988, Ser. No. 222,436

Int. Cl.[5] A61K *47/36*

U.S. Cl. 514—21 7 Claims



1. A method for administering systemically a therapeutically-effective amount of a trophic factor to a mammal for treatment of a neurodegenerative disease, said method comprising administering a formulation comprised of:

(a) a therapeutically effective amount of a trophic factor selected from NGF, β-NGF and des 1-9 NGF, for treating a neurodegenerative disease or for regenerating neuronal tissue or for protecting neural tissue from damage induced by chemical, metabolic, mechanical or viral agents or by radiation; and

(b) a carrier comprising a phospholipid component and a ganglioside component selected from GM_1, GD_1 and GT_1 ganglioside types, said carrier containing said trophic factor;

whereby a formulation is provided capable of slowly releasing the trophic factor or protecting the trophic factor from degradative enzymes.

5,073,544

TRANSDERMAL COMPOSITIONS OF 1-OXOHYDROCARBYL-SUBSTITUTED AZACYCLOHEXANES

James V. Peck, Costa Mesa, and Gevork Minaskanian, Irvine, both of Calif., assignors to Whitby, Inc., Richmond, Va.

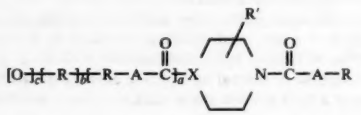
Continuation of Ser. No. 897,043, Aug. 15, 1986, abandoned. This application Mar. 23, 1989, Ser. No. 327,763

Int. Cl.[5] A61K *31/70, 31/715, 31/505*; A01N *43/04*

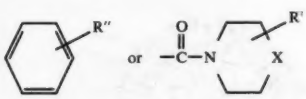
U.S. Cl. 514—24 17 Claims

10. A method for enhancing penetrability of the skin or mucous membrane so as to administer an effective amount of a physiologically active agent selected from the group consisting

of lincomycin, clindamycin, erythromycin, and pharmaceutically useful salts thereof, or from the group consisting of iododeoxyuridine and 5-fluorouracil, through the skin or mucosal membrane of a human or animal and retain said physiologically active agent in the body tissues, which method comprises contacting said skin or mucosal membrane with a compound of the general formula

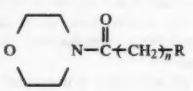


wherein X may represent sulfur, oxygen or nitrogen; a and b may be 0 or 1, c may be 0, 1 or 2, except that when X is oxygen, a, b and c are 0, when X is nitrogen c is 0 and only one of a or b is 1, and when X is sulfur a and b are 0; A is a branched or a straight chain, divalent aliphatic radical having up to 17 carbon atoms and from 0 to 2 double bonds; R′ is selected from the group consisting of H, a lower alkyl group having from 1 to 4 carbon atoms, phenyl, lower alkyl having from 1 to 4 carbon atoms or halogen substituted phenyl, acetamido, halogen, piperidinyl, lower alkyl having from 1 to 4 carbon atoms or halogen substituted piperidinyl, or carboxamide; and R is hydrogen or a lower alkyl group having from 1 to 4 carbon atoms,



wherein R″ is H or halogen, and salts thereof.

14. A method for topically administering a physiologically active agent selected from the group consisting of lincomycin, clindamycin, erythromycin, and pharmaceutically useful salts thereof, or from the group consisting of iododeoxyuridine and 5-fluorouracil, to a human or animal in need of such treatment which comprises contacting said skin or mucosal membrane of the human or animal with an effective amount of a physiologically active agent in the presence of a non-toxic, effective penetrating amount of a compound represented by the general formula



wherein n is 4–16 and R is —CH_3 and salts thereof.

5,073,545

AGENT CONTAINING AN ELLAGIC ACID SERIES COMPOUND FOR EXTERNAL APPLICATION AND USE THEREOF

Masatoshi Arima, Odawara; Hiroaki Nishizawa, Fujisawa; Keiji Takeuchi, Tokyo; Hiroshi Deura, Yotsukaidou, and Keiichiro Ishida, Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan

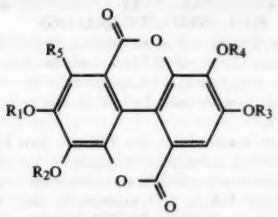
Filed Jun. 6, 1988, Ser. No. 202,321

Claims priority, application Japan, Jun. 9, 1987, 62-143507; Mar. 24, 1988, 63-70396

Int. Cl.[5] **A61K** *31/70;* **A01N** *43/16*

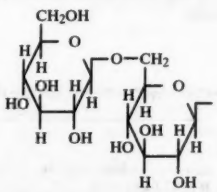
U.S. Cl. 514—27 **10 Claims**

1. A method of lightening and whitening human skin, comprising applying to the human skin a composition comprising an effective amount of at least one ellagic acid series compound represented by formula I:



I

wherein R_1 to R_4 are the same or different and represent a hydrogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, a polyalkylene oxide residue where the alkylene oxide unit has 2 to 3 carbon atoms, or a sugar residue represented by the formula II:



II

and wherein R_5 is a hydrogen atom, a hydroxyl group or an alkoxy group having 1 to 8 carbon atoms, or a salt thereof.

5,073,546

LIPOPHILIC SALTS OF S-ADENOSYL-L-METHIONINE (SAM) WITH ACYLATED TAURINE DERIVATIVES

Vincenzo Zappia, Via S. Giacomo Dei Capri 109/B, and Mario DeRosa, Via E. Nicolardi, 188, both of 80100 Napoli, Italy

Filed May 29, 1990, Ser. No. 469,583

Int. Cl.[5] **A61K** *31/70;* **C07H** *19/167*

U.S. Cl. 514—46 **2 Claims**

1. A lipophilic salt of S-adenosyl-L-methionine (SAM) of the formula

$$SAM^{n+}[R—CO—NH—(CH_2)_2—SO^-{}_3]_n$$

in which R-CO is a member selected from the group consisting of C_{12}–C_{26} saturated and unsaturated, linear and branched acyl and C_{12}–C_{26} cycloalkyl-substituted acyl, and n is an integer from 3 to 6 according to the SAM charge.

5,073,547

DOPAMINE PRO-DRUG

Cesare Casagrande, Arese, and Francesco Santangelo, Milan, both of Italy, assignors to Simes Societa Italiana Medicinali e Sintetici S.p.A., Vicenza, Italy

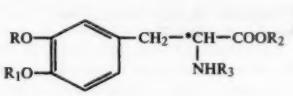
Filed Apr. 20, 1990, Ser. No. 512,211

Claims priority, application Italy, Apr. 20, 1989, 20209 A/89; Apr. 20, 1989, 20210 A/89

Int. Cl.[5] **A61K** *31/275, 31/135;* **C07C** *255/50;* **C07F** *9/02*

U.S. Cl. 514—79 **5 Claims**

1. A compound of the formula



(I)

wherein

the asymmetric carbon atom marked with an asterisk has S

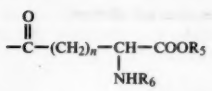
configuration, and either R or R_1 is hydrogen and the other one is a group of the formula

wherein

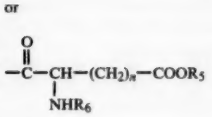
R_4 is hydrogen, phenyl, alkylphenyl or a C_1–C_6 alkyl optionally substituted by one to three groups selected from hydroxy, alkoxy, acyloxy, amino, carboxy or alkoxycarbonyl;

R_2 is a straight or branched C_1–C_4 alkyl, a C_3–C_6 cycloalkyl or a phenylalkyl having from 1 to 4 C atoms in the alkyl portion optionally substituted by 1 to 3 substituents selected from halogens, C_1–C_3 alkoxy and C_1–C_3 alkyl;

R_3 is hydrogen or an acyl group of a natural alpha-amino acid selected from glycine, alanine, valine, leucine, isoleucine, serine, threonine, cysteine, cystine, methionine, proline, hydroxyproline, phenylalanine, tyrosine, tryptophan, arginine, lysine, and histidine, optionally N-acylated by a C_1–C_4 acyl, or an acyl group of a natural aminoacid ester of the formula



or



wherein

n is 1 or 2;

R_5 is hydrogen or a C_1–C_3 acyl;

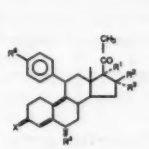
R_6 is hydrogen or a C_1–C_4 acyl; or a salt thereof with pharmaceutically acceptable acid or base.

5,073,548

11 β-SUBSTITUTED PROGESTERONE ANALOGS

C. Edgar Cook; Mansukh C. Wani, both of Durham; Yun W. Lee, Chapel Hill; Jerry R. Reel, Cary, all of N.C., and Douglas Rector, Mobile, Ala., assignors to Research Triangle Institute, Research Triangle Park, N.C.

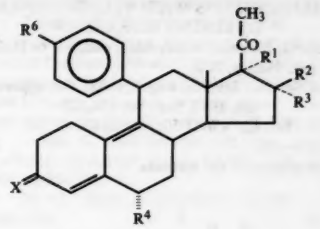
Division of Ser. No. 210,503, Jun. 23, 1988, Pat. No. 4,954,490.
This application Apr. 3, 1990, Ser. No. 504,129
Int. Cl.[5] C07J *17/00;* **A61K** *31/58*
U.S. Cl. 514—169 **16 Claims**



IV

Structure of Compounds of This Invention (R^1–R^4 and X are Defined in the Text)

1. An 11β-aryl-19-norprogesterone of the formula:



wherein:

(1) R^1 is C_{2-4} alkenyl, C_{2-4} alkynyl, R^2 is hydrogen, R^3 is H, C_{1-4} alkyl, C_{2-4} alkenyl, or C_{2-4} alkynyl, R^4 is H, CH_3, F or Cl, R^6 is H, $(CH_3)_2N$, CH_3O, CH_3CO, CH_3S, CH_3SO or CH_3SO_2 and X is O or $NOCH_3$; or

(2) R^1 is H or C_{1-4} alkyl, R^2 is hydrogen, R^3 is H, C_{1-4} alkyl, C_{2-4} alkenyl or C_{2-4} alkynyl, R^4 is H, CH_3, F or Cl, R^6 is H, CH_3CO, CH_3O, CH_3SO or CH_3SO_2 and X is O or $NOCH_3$; or

(3) R^1 is H or C_{1-4} alkyl, R^2 is hydrogen, R^3 is C_{2-4} alkyl, C_{2-4} alkenyl or C_{2-4} alkynyl, R^4 is H, CH_3, F or Cl, R^6 is CH_3O, CH_3CO, H, $(CH_3)_2N$, CH_3SO or CH_3SO_2 and X is O or $NOCH_3$.

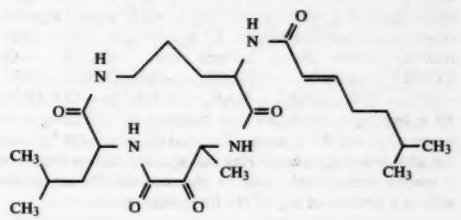
5,073,549

BU-4164E - A AND B, PROLYL ENDOPEPTIDASE INHIBITORS AND THEIR METHODS OF USE

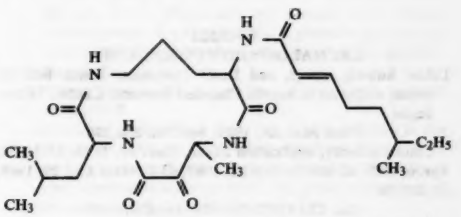
Soichiro Toda, Ohmiya; Yasutaro Hamagishi, Fujisawa; Toshikazu Oki, Yokohama, and Koji Tomita, Tokyo, all of Japan, assignors to Bristol-Myers Squibb Company, New York, N.Y.

Division of Ser. No. 497,292, Mar. 22, 1990, Pat. No. 4,999,349.
This application Oct. 4, 1990, Ser. No. 592,753
Int. Cl.[5] A61K *31/395;* **C12P** *17/12;* **C07D** *255/02;* **C12N** *1/20;* **C07K** *5/12*
U.S. Cl. 514—183 **2 Claims**

1. A method of therapeutically treating a mammalian host affected by amnesia which comprises administering to said host an effective anti-amnesia dose of BU-4164E A having the structure



or BU-4164E B, having the structure



or combinations thereof.

5,073,550

CEPHALOSPHORINS WITH SULFUR-CONTAINING OXYIMINO SIDE CHAIN

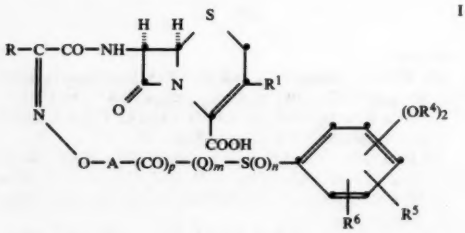
Erwin Götschi, Reinach, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 229,960, Aug. 9, 1988. This application Aug. 28, 1990, Ser. No. 574,329

Int. Cl.[5] C07D *501/36;* **A61K** *31/545*

U.S. Cl. 514—202 **28 Claims**

1. A compound of the formula



I

wherein R is a mononuclear carbocyclic aromatic group, a 5-membered aromatic heterocyclic group which has as the hetero (non-carbon) ring member(s) an oxygen or sulphur atom or an imino or lower alkylimino group and optionally one or two nitrogen atoms, or a 6-membered aromatic heterocyclic group, which has one to three nitrogen atoms as the hetero ring member(s); R^1 is the group $—CH_2R'$ wherein R' is azido, lower alkanoyloxycarbamoyl oxy, N-(lower alkyl) carbamoyloxy, N,N-di(lower alkanoyloxy, carbamoyloxy or a 5- or 6-membered N-containing heterocyclic group which is attached via a nitrogen atom and which is not fused with another ring or is fused by a 5- or 6-membered cycloalkane ring or by a benzene ring and which is unsubstituted or substituted with lower alkyl or carbamoyl; A is lower alkylene or C_{3-7}-cycloalkylene which is optionally substituted with carboxy, carbamoyl, lower alkylcarbamoyl or di(lower alkyl)carbamoyl; Q is lower alkylene or C_{3-7}-cycloalkylene which is optionally substituted with carboxy, carbamoyl, lower alkylcarbamoyl or di(lower alkyl)carbamoyl, or the $—NR^2—$, or $NR^2NR^3—$; R^2 and R^3 are independently hydrogen or lower alkyl; p and m are zero or 1; n is zero, 1 or 2; R^4 is hydrogen, lower alkanoyl or tri(lower alkyl)silyl; two R^4 groups together represent diphenylmethylene; R^5 is hydrogen, lower alkyl, hydroxy, lower alkoxy, halogen, nitro, $—OCOR^7$, $—OCOOR^{71}$, $—N(R^7)_2$, $—NHCOR^7$, $—NHCOOR^{71}$, COR^7, $—SR^7$, $—SOR^7$, SO_2R^7, $—SO_3H$, $—COOR^7$ or $—CON(R^7)_2$, R^6 is hydrogen, lower alkyl or halogen, R^7 is hydrogen or lower alkyl and R^{71} is lower alkyl, and the two $—OR^4$ groups are attached to the phenyl ring via adjacent carbon atoms, or a readily hydrolyzable ester or pharmaceutically acceptable salt, or a hydrate of any of the foregoing.

5,073,551

CEPHALOSPORIN COMPOUNDS

Takeo Kobori, Atsugi, and Daiei Tunemoto, Zama, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

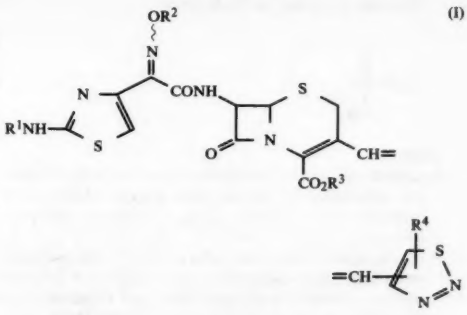
Filed Mar. 24, 1989, Ser. No. 334,206

Claims priority, application Japan, Mar. 30, 1988, 63-74676; Apr. 6, 1988, 63-83014; Aug. 25, 1988, 63-209433; Aug. 25, 1988, 63-209434

Int. Cl.[5] C07D *501/36;* **A61K** *31/545*

U.S. Cl. 514—206 **11 Claims**

1. A cephalosporin compound of the formula



(I)

in which R^1 is a hydrogen atom or a protective group for the amino group,

R^2 is a hydrogen atom or a protective group for the hydroxyl group,

R^3 is a hydrogen atom, a salt-forming cation or a protective group for the carboxyl group, and

R^4 is a hydrogen atom, a halogen atom or a lower alkyl group,

or a pharmacologically acceptable salt thereof.

5,073,552

SUBSTITUTED BENZOPHENONE DICARBOXYLIC ACIDS

Mark W. Beltz, and Venkataraman Ramachandran, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

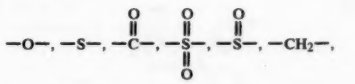
Filed Sep. 4, 1990, Ser. No. 576,849

Int. Cl.[5] C07D *305/00*

U.S. Cl. 549—214 **10 Claims**

1. Compounds of the formula

where R is nitro; Y and Y' are the same or different and are a chemical bond,



$—C(CH_3)_2—$, $—CF_2$, or $—C(CF_2)_2—$ or $—Si(CH_3)_2—$

$COOR_1$, where R_1 is and R_A and R_B are each independently hydrogen, —COOH, C_1 to C_6 linear or branched alkyl or taken together form an anhydride ring with the proviso that both R_A and R_B can not be hydrogen and m is 0 or 1.

5,073,553

3-ALKOXY SUBSTITUTED BENZOFURO[3,2-C]QUINOLIN-6-ONE COMPOUNDS

Tetsuhide Kamijo; Arao Ujiie; Naoyuki Tsutsumi, and Atsushi Tsubaki, all of Nagano, Japan, assignors to Kissei Pharmaceutical Co., Ltd., Nagano, Japan

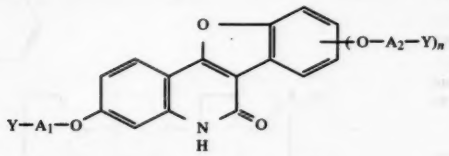
Filed Nov. 22, 1989, Ser. No. 440,069

Claims priority, application Japan, Nov. 22, 1988, 63-295715; Nov. 22, 1988, 63-295716

Int. Cl.[5] A61K *31/535;* C07D *413/00*

U.S. Cl. 514—232.8 14 Claims

1. A compound represented by the formula:



wherein A_1 and A_2 are the same, and represent a group of the formula $—CH_2)_m$ or $CH_2—CH(OH)CH_2—$, in which m represents an integer of from 1 to 3; Y represents an N,N-dialkylamino group, an N-monoalkylamino group, a morpholino group or a 1-pyrrolidinyl group; n reresents 0 or 1, and pharmaceutically acceptable acid addition salts thereof.

5,073,554

TWO NON-POLYGLUTAMATABLE ANTIFOLATES

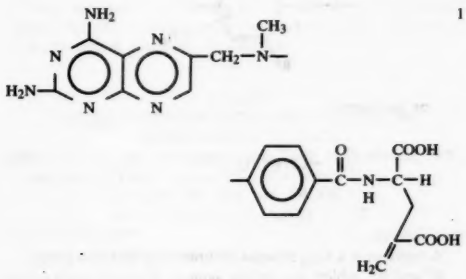
Madhavan G. Nair, 7005 Charleston Oaks Dr. N., Mobile, Ala. 36695

Continuation-in-part of Ser. No. 467,025, Jan. 18, 1990, Pat. No. 4,996,207. This application Aug. 3, 1990, Ser. No. 562,673

Int. Cl.[5] A61K *31/505*

U.S. Cl. 514—249 6 Claims

1.



1

5,073,555

MEDICAMENTS INTENDED FOR COMBINED USE IN THE IMPROVEMENT OF LYMPHOCYTE FUNCTION TO LOWER CHOLESTEROL LEVELS

R. Arnold Smith, Jackson, Miss., assignor to George D. McAdory, Jackson, Miss.

Continuation-in-part of Ser. No. 177,121, Apr. 4, 1988, Pat. No. 4,929,640. This application May 25, 1990, Ser. No. 528,885

Int. Cl.[5] A61K *31/34, 31/50, 31/495*

U.S. Cl. 514—252 9 Claims

1. A method for reducing cholesterol levels in human beings requiring such treatment comprising orally administering to said human being a therapeutically effective amount of a dopamine agonist selected from the group consisting of bromocriptine, lergotrile and pergolide, and an ascorbate.

5,073,556

4-OXOQUINOLINE-3-CARBOXYLIC ACID DERIVATIVES AND THEIR USE

Masayuki Iwata, Tokyo; Tomio Kimura, Ube; Teruhiko Inoue, Ube; Yoshimi Fujihara, Ube, and Tetsushi Katsube, Ube, all of Japan, assignors to Sankyo Company Limited, Tokyo and Ube Industries Limited, Yamaguchi, both of, Japan

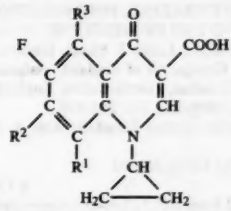
Continuation of Ser. No. 381,025, Jul. 17, 1989. This application Feb. 22, 1991, Ser. No. 659,829

Claims priority, application Japan, Jul. 20, 1988, 63-180557; Sep. 7, 1988, 63-224220

Int. Cl.[5] A61K *31/495;* C07D *401/04*

U.S. Cl. 514—254 14 Claims

1. A compound of formula (I):



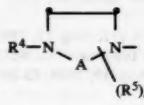
(I)

in which

R^1 represents a methoxy group having at least one fluorine substituent;

R^2 represents a group selected from the group consisting of:

(i) groups of formula (II):



(II)

in which:

R^4 represents a hydrogen atom; a hydroxy group; an amino group; a C_1–C_6 alkyl group; a substituted C_1–C_6 alkyl group having at least one substituent selected from the group consisting of substituents (a), defined below; an aralkyl group; a C_1–C_6 aliphatic acyl group; or a substituted C_2–C_6 aliphatic acyl group having at least one substituent selected from the group consisting of substituents (a), defined below;

R^5 represents a hydrogen atom, a C_1–C_6 alkyl group or a substituted C_1–C_6 alkyl group having at least one substituent selected from the group consisting of substituents (b), defined below;

A represents an ethylene group, or a group of formula $—COCH_2—$, and

m represents 1 or 2;

R^3 represents a hydrogen atom or an amino group;

substituents (a):

hydroxy groups, C_1–C_6 alkoxy groups, C_2–C_6 aliphatic acyloxy groups, C_1–C_6 aliphatic acyl groups, carboxy groups, C_2–C_6 alkoxycarbonyl groups, sulfo groups, amino groups, C_2–C_6 aliphatic acylamino groups, and mono- and di-(C_1–C_6 alkyl) substituted amino groups;

substituents (b):

hydroxy groups, C_1–C_6 alkoxy groups, and halogen atoms; and

said aralkyl groups have from 1 to 4 carbon atoms in the alkyl part and have an aryl part which has from 6 to 10 carbon atoms and which is unsubstituted or has at least one substituent selected from the group consisting of substituents (c), defined below;

substituents (c):

hydroxy groups, C_1–C_6 alkyl groups, C_1–C_6 alkoxy

groups, C_2–C_6 aliphatic acyloxy groups, C_2–C_6 aliphatic acyl groups, carboxy groups, C_2–C_6 alkoxycarbonyl groups, sulfo groups, nitro groups, cyano groups, amino groups, C_2–C_6 aliphatic acylamino groups, and mono- and di-(C_1–C_6 alkyl) substituted amino groups; or a pharmaceutically acceptable salt, ester or amide thereof.

11. A pharmaceutical composition for the treatment of bacterial infections, comprising an effective amount of an antibacterial agent in combination with a pharmaceutically acceptable carrier or diluent, wherein the antibacterial agent is selected from the group consisting of compounds of formula (I) and pharmaceutically acceptable salts, esters and amides thereof, as claimed in claim **1**.

5,073,557

NOVEL SUBSTITUTED PYRAZINE, FORMULATIONS THEREOF AND USE IN MEDICINE

Raymond Baker, Much Hadham; Leslie J. Street, Harlow, and John Saunders, Amwell Grange, all of England, assignors to Merck Sharp & Dohme Limited, Hertfordshire, England

Filed Aug. 8, 1990, Ser. No. 564,490

Claims priority, application United Kingdom, Aug. 8, 1989, 8918060

Int. Cl.[5] **C07D** *453/02*

U.S. Cl. 514—254 **6 Claims**

1. A compound selected from (R)-3-[2-(6-chloropyrazin)yl]-1-azabicyclo[2.2.2]octane and salts thereof.

5,073,558

AMINOPYRIMIDINE DERIVATIVE AND INSECTICIDE OR BACTERICIDE CONTAINING THE DERIVATIVE

Tokio Obata; Katsutoshi Fujii; Isamu Narita, and Shoji Shikita, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

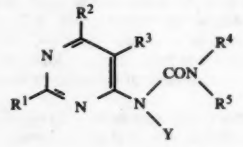
Continuation-in-part of Ser. No. 394,197, Aug. 15, 1989, abandoned. This application Oct. 26, 1989, Ser. No. 427,818

Claims priority, application Japan, Aug. 19, 1988, 63-204728; Nov. 30, 1988, 63-300996

Int. Cl.[5] **C07D** *239/42, 401/12, 413/12;* **A01N** *43/54*

U.S. Cl. 514—259 **32 Claims**

1. An aminopyrimidine compound represented by the formula (I):

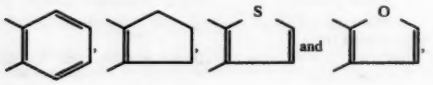


(I)

wherein

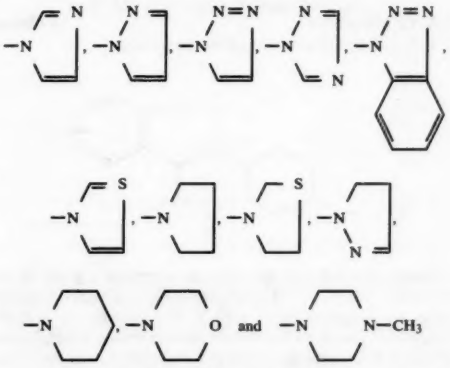
R^1 represents hydrogen atom, a C_{1-4} alkyl group, a C_{3-6} cycloalkyl group or a halogen atom;

R^2 and R^3, which may be the same or different, each represent a C_{1-4} alkyl group or a halogen atom, or R^2 and R^3 together with the carbon atom to which they are bonded may be a 5-membered or 6-membered ring selected from the group consisting of



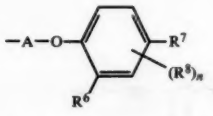
and said ring may be substituted with 1 or 2 lower alkyl groups or a halogen atom;

R^4 and R^5, which may be the same or different, each represent a hydrogen atom, a C_{1-4} alkyl group, a formyl group, a phenylalkyl group, a nonsubstituted phenyl group or a phenyl group substituted by a substituent selected from the group consisting of 1 to 3 halogen atoms, C_{1-4} alkyl groups, C_{2-5} alkenyl groups, C_{1-4} alkoxy groups, C_{3-5} alkenyloxy groups, C_{3-5} alkynyloxy groups, a trifluoromethyl group and a nitro group; or R^4 and R^5 together with the nitrogen atom to which they are bonded may be a 5-membered or 6-membered ring, said ring being selected from the group consisting of



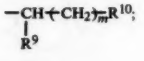
and further said ring may be substituted with 1 or 2 C_{1-4} alkyl groups, a halogen atom, a nonsubstituted phenyl group, a phenyl group substituted by a substituent selected from the group consisting of 1 to 3 halogen atoms, C_{1-4} alkyl groups, C_{2-5} alkenyl groups, C_{1-4} alkoxy groups, C_{3-5} alkenyloxy groups, C_{3-5} alkynyloxy groups, a trifluoromethyl group and a nitro group or a phenylimino group;

Y represents a group of the formula:



(II)

or the formula



(III)

wherein,

A represents a C_{2-6} straight or branched alkylene group;

R^6 and R^8, which may be the same or different, each represent hydrogen atom, a C_{1-4} alkyl group or a halogen atom;

n represents an integer of 1 or 2;

R^7 represents hydrogen atom, a C_{2-5} alkenyl group, a dioxolanylmethyl group which may be substituted with 1 or 2 C_{1-4} alkyl groups, an ethoxyimino alkyl group or a C_{1-10} alkyl group which may be substituted with C_{1-4} alkoxy, C_{3-5} alkenyloxy, C_{3-5} alkynyloxy or benzyloxy;

R^9 represents a hydrogen atom or a C_{1-4} alkyl group;

m represents an integer of 4 to 15;

R^{10} represents a C_{1-4} alkyl group, a C_{1-4} alkoxy group, a halogen atom, an acetoxy group or a nonsubstituted phenoxy group or a phenoxy group substituted with a substituent selected from the group consisting of 1 to 3 halogen atoms, C_{1-4} alkyl groups, C_{2-5} alkenyl groups, C_{1-4} alkoxy groups, C_{3-5} alkenyloxy groups, C_{3-5} alkynyloxy groups, a trifluoromethyl group and a nitro group, or an acid addition salt thereof.

5,073,559
2-SUBSTITUTED PURINONE HAVING PHOSPHODIESTERASE INHIBITORY ACTIVITY

William J. Coates, Welwyn Garden City, England, assignor to Smith Kline & French Laboratories, Ltd., Welwyn Garden City, England

Filed Jul. 19, 1989, Ser. No. 382,610

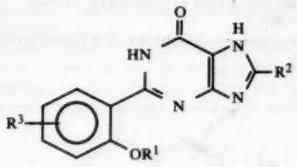
Claims priority, application United Kingdom, Jul. 25, 1988, 8817651.6

The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

Int. Cl.[5] A61K *31/52*; C07D *473/30*

U.S. Cl. 514—262 **18 Claims**

1. A compound of formula (1):



(1)

or pharmaceutically acceptable salt thereof, wherein

R^1 is C_{1-6}alkyl, C_{2-6}alkenyl, C_{3-5}cycloalkylC_{1-4}alkyl, phenylC_{1-4}alkyl or C_{1-4}alkyl substituted by 1 to 6 fluoro groups;

R^2 is hydrogen, hydroxy, C_{1-4}alkyl, phenyl, mercapto, C_{1-4}alkylthio, CF_3 or amino

R^3 is hydrogen, nitro, amino, C_{1-4}alkanoylamino, C_{1-4}alkoxy, C_{1-4}alkyl, halo, $SO_2NR^4R^5$, $CONR^4R^5$, cyano or C_{1-4}alkyl$S(O)_n$;

R^4 and R^5 are independently hydrogen or C_{1-4}alkyl; and

n is 0, 1 or 2;

provided that R^3 is not hydrogen when R^1 is C_{1-6}alkyl or C_{2-6}alkenyl and R^2 is hydrogen or hydroxy.

17. A method of effecting bronchodilatation in a host in need thereof by administration of a non-toxic but effective amount of a compound according to claim **1**.

18. A method of combatting allergic disease in a host in need thereof by administration of a non-toxic but effective amount of a compound according to claim **1**.

5,073,560
SPIRO-ISOXAZOLIDINE DERIVATIVES AS CHOLINERGIC AGENTS

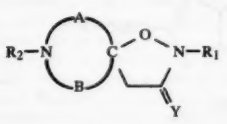
Edwin S. Wu, and Alexander Kover, both of Rochester, N.Y., assignors to Fisons Corporation, Rochester, N.Y.

Filed Jul. 20, 1990, Ser. No. 556,112

Int. Cl.[5] A61K *31/44*; C07D *498/10*

U.S. Cl. 514—278 **8 Claims**

1. A compound of formula I,



I

wherein:

A represents $(CH_2)_m$ optionally substituted by R_3,

B represents $(CH_2)_n$ optionally substituted by R_4,

R_1 represents hydrogen, C_1–C_6 alkyl, C_{1-6} alkenyl or C_{1-6} alkynyl,

R_2 represents hydrogen, C_1–C_6 alkyl or $COOR_5$, in which R_5 represents C_1–C_6 alkyl,

R_3 and R_4 independently represent hydrogen or C_1–C_6 alkyl,

n and m independently represent an integer 2,

Y represents O or S,

and pharmaceutically acceptable acid addition salts thereof.

5,073,561
METHODS OF TREATING DEPRESSION AND PSYCHOSES

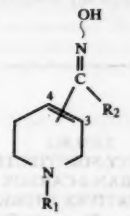
Linda L. Coughenour; Robert E. Davis; David A. Downs; Thomas G. Heffner; Leonard T. Meltzer; Walter H. Moos; David W. Moreland, and Haile Tecle, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 259,081, Oct. 18, 1988, Pat. No. 4,929,734, which is a continuation-in-part of Ser. No. 32,839, Mar. 31, 1987, Pat. No. 4,798,841. This application Mar. 5, 1990, Ser. No. 488,591

Int. Cl.[5] A61K *31/44*

U.S. Cl. 514—357 **2 Claims**

2. A method for treating psychoses involving a sigma receptor in a mammal suffering therefrom which comprises administering to such mammal an antipsychotic effective amount of a compound of the formula:



I

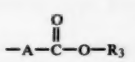
wherein

R_1 is selected from hydrogen;

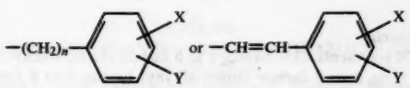
straight or branched alkyl of from one to six carbon atoms substituted with hydroxy or alkoxyl of from one to four carbon atoms;

straight or branched alkenyl of from two to six carbon atoms substituted with hydroxy or alkoxyl of from one to four carbon atoms;

straight or branched alkynyl of from two to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;



where A is a bond or in a hydrocarbon chain of from one to four carbon atoms, optionally substituted with halogen, and when containing two or more carbon atoms may contain one double bond and R_3 is alkyl of from one to six carbon atoms; or



where n is zero, two, three or four and X and Y are independently selected from

hydrogen,

fluorine,

chlorine,

bromine,

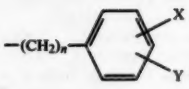
hydroxy,

straight or branched alkyl of from one to three carbon atoms, or

alkoxyl of from one to four carbon atoms;

R_2 is selected from hydrogen;

straight or branched alkynyl of from two to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;



where n is zero to six and
X and Y are independently selected from
hydrogen,
fluorine,
chlorine,
bromine,
hydroxy,
straight or branched alkyl of from one to three carbon atoms, or alkoxyl of from one to four carbon atoms;
with the proviso that R_1 and R_2 not both simultaneously by hydrogen; or a pharmaceutically acceptable salt thereof.

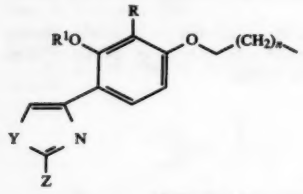
5,073,562

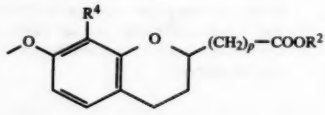
ALKOXY-SUBSTITUTED DIHYDROBENZOPYRAN-2-CARBOXYLIC ACIDS AND DERIVATIVES THEREOF

Stevan W. Djuric, Glenview; Thomas D. Penning, Elmhurst, and James P. Snyder, Glenview, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed May 10, 1990, Ser. No. 521,777
Int. Cl.[5] C07D *419/12;* A61K *31/425*
U.S. Cl. 514—365 **33 Claims**

1. A compound of the formula:





wherein
R represents alkyl having 2 to 6 carbon atoms, alkenyl having 2 to 6 carbon atoms, alkynyl having 2 to 6 carbon atoms, or $-(CH_2)_m-R^3$ wherein R^3 represents cycloalkyl of 3 to 5 carbons atoms and m is 1 or 2;
R^1 represents alkyl having 1 to 4 carbon atoms;
R^2 represents hydrogen or alkyl having 1 to 5 carbon atoms;
R^4 represents alkyl having 1 to 6 carbon atoms;
n is an integer from 1 to 5;
p is an integer from 0 to 6;
Y represents sulfur; and
Z represents hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, NR^4R^5 wherein R^4 and R^5 are independently hydrogen or alkyl having 1 to 4 carbon atoms, or SR^6 wherein R^6 is, hydrogen, benzyl or alkyl having 1 to 4 carbon atoms;
and the stereoisomers and pharmaceutically acceptable salts thereof.

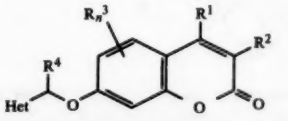
5,073,563

ALKOXYCOUMARINS SUBSTITUTED BY A HETEROCYCLIC RADICAL, THEIR PREPARATION AND THERAPEUTIC AGENTS CONTAINING THESE COMPOUNDS

Fritz-Frieder Frickel, Mountain Lakes, N.J.; Thomas Kuekenhoehner, Frankenthal, Fed. Rep. of Germany; Beatrice Rendenbach-Mueller, Waldsee, Fed. Rep. of Germany; Harald Weifenbach, Ludwigshafen, Fed. Rep. of Germany, and Hans-Juergen Teschendorf, Dudenhofen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

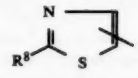
Filed Oct. 5, 1989, Ser. No. 417,451
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1988, 3834860
Int. Cl.[5] C07D *417/12;* A61K *31/425*
U.S. Cl. 514—365 **7 Claims**

1. An alkoxycoumarin substituted by a heterocyclic radical, of the formula



I

in which R^1 and R^2 independently of one another are each hydrogen, C_1–C_5-alkyl, trifluoromethyl, phenyl or halogen, or together form a C_3–C_5-alkylene chain, R^3 is C_1–C_5-alkyl or halogen, n is an integer of from 0 to 3, R^4 is hydrogen or C_1–C_4-alkyl and Het is



where R^8 is C_1–C_5-alkyl, C_3–C_8-cycloalkyl, benzyl or phenyl.

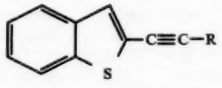
5,073,564

ETHYNYLBENZOTHIOPHENE PESTICIDES

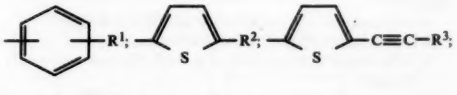
David M. Roush, Princeton, N.J.; Steven G. Davis, Dayton, Ohio; Kathryn A. Lutomski, Coram, N.Y.; Gary A. Meier, Robbinsville, N.J.; Richard B. Phillips, Palo Alto, Calif., and Susan E. Burkart, Trenton, N.J., assignors to FMC Corporation, Philadelphia, Pa.

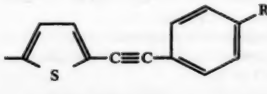
Filed Jul. 6, 1990, Ser. No. 549,516
Int. Cl.[5] C07D *333/54, 409/16, 417/16;* A01N *43/18*
U.S. Cl. 514—365 **21 Claims**

1. A pesticidal compound of the formula



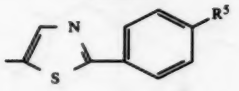
wherein R is selected from





and

-continued



R^1 is selected from hydrogen, halogen, lower alkyl, lower haloalkyl, and phenylethynyl;

R^2 is selected from halogen, lower alkylthio, lower haloalkenyl, haloalkenylthio, phenyl lower alkenyl, formyl, lower alkoxycarbonyl, carboxy lower alkenyl, lower alkoxycarbonyl lower alkenyl, phenyl, methylthien-2-yl, and 2-thienyl;

R^3 is selected from alkyl, lower trialkylsilyl, lower haloalkyl, hydroxyalkyl, alkylcarbonyl, 2-thienyl, methylthien-2-yl, and benzothien-2-yl;

R^4 is selected from hydrogen, halogen, lower alkyl, lower haloalkyl, lower alkoxy, lower haloalkylthio, lower alkoxycarbonyl, amino, and lower alkylcarbonylamino; and

R^5 is selected from hydrogen, lower alkyl, and lower haloalkyl.

5,073,565

TETRAZOLE UREAS AND THIOUREAS AND THEIR USE AS ACAT INHIBITORS

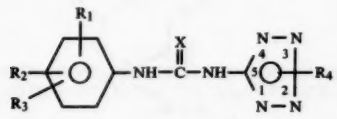
Alexander W. Chucholowski, Bad Krozingen, Fed. Rep. of Germany, and Andrew D. White, Lakeland, Mich., assignors to Warner-Lambert Company, Morris Plain, N.J.

Filed Apr. 27, 1990, Ser. No. 515,984

Int. Cl.[5] C07D 257/06; A61K 31/41

U.S. Cl. 514—381 **20 Claims**

1. A compound of the formula



wherein X is oxygen or sulfur; wherein each of R_1, R_2, and R_3 is the same or different and is selected from

hydrogen;

fluorine;

chlorine;

bromine;

a straight or branched alkyl group having from one to six carbon atoms;

a straight or branched alkoxy group having from one to six carbon atoms;

benzoyl which is unsubstituted or is substituted on the aromatic ring with from one to three substituents selected from fluorine, chlorine, bromine, iodine, a straight or branched alkyl group having from one to six carbon atoms or a straight or branched alkoxy group having from one to six carbon atoms;

benzyl which is unsubstituted or is substituted on the aromatic ring with from one to three substituents selected from fluorine, chlorine, bromine, iodine, a straight or branched alkyl group having from one to six carbon atoms or a straight or branched alkoxy group having from one to six carbon atoms;

phenyl which is unsubstituted or is substituted with from one to three substituents selected from fluorine, chlorine, bromine, iodine, a straight or branched alkyl group having from one to six carbon atoms, or a straight or branched alkoxy group having from one to six carbon atoms;

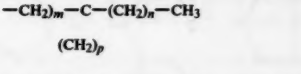
NR_5R_6 wherein each of R_5 and R_6 is the same or different and is hydrogen, a straight or branched alkyl group having from one to four carbon atoms or $—NR_5R_6$ taken together form monocyclic heterocyclic group selected from pyrrolidino, piperidino, piperazino or piperazino substituted on the 4-position with a straight or branched alkyl group having from one to four carbon atoms;

$—COR_7$ wherein R_7 is hydroxy, a straight or branched alkoxy group having from one to six carbon atoms, benzyloxy which is unsubstituted or is substituted on the aromatic ring with from one to three substituents selected from fluorine, chlorine, bromine, iodine, a straight or branched alkyl group having from one to six carbon atoms or a straight or branched alkoxy group having from one to six carbon atoms, or R_7 is $—NR_5R_6$ wherein R_5 and R_6 have the meanings defined above;

wherein R_4 is attached to either the 1- or 2-position of the tetrazole ring and is selected from

(a) a straight or branched hydrocarbon chain having from one to twenty carbon atoms and which is saturated or contains from one to three double bonds and wherein said chain is unsubstituted or is substituted with one or two substituents selected from fluorine, chlorine, bromine, iodine, straight or branched alkoxy having from one to four carbon atoms, hydroxy, or tetrahydro-pyran-6-yloxy;

(b) a spiroalkyl group of the formula



wherein each of m and n is independently zero or one to six, and p is two to six;

(c) the group $-(CH_2)_qNR_8R_9$ wherein q is two to four and each of R_8 and R_9 is hydrogen or a straight or branched alkyl group having from one to 20 carbon atoms provided that one of R_8 and R_9 is other than hydrogen; or

(d) the group $—(CH_2)_r$-phenyl wherein r is zero to four and the phenyl moiety is unsubstituted or substituted with from one to three substituents selected from fluorine, chlorine, bromine, iodine, a straight or branched alkyl group having from one to six carbon atoms, or a straight or branched alkoxy group having from one to six carbon atoms; and pharmaceutically acceptable salts thereof with the proviso that when R_4 is phenyl on the 1-position of the tetrazole ring at least one of R_1, RH_2,and $R_3$is other than hydrogen.

20. A method of treating atherosclerosis in a patient in need of treatment which comprises administering to said patient an effective amount of a compound of claim **1**.

5,073,566

ANGIOTENSIN II ANTAGONIST 1,3-IMIDAZOLES AND USE THEREAS

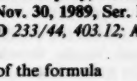
Sherryl L. Lifer, Indianapolis; Winston S. Marshall, Bargersville; Farîborz Mohamadi; Jon K. Reel, both of Indianapolis; Richard L. Simon, Greenwood; Mitchell I. Steinberg, Indianapolis, and Celia A. Whitesitt, Greenwood, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 30, 1989, Ser. No. 444,456

Int. Cl.[5] C07D 233/44, 403.12; A61K 31/41, 31/34

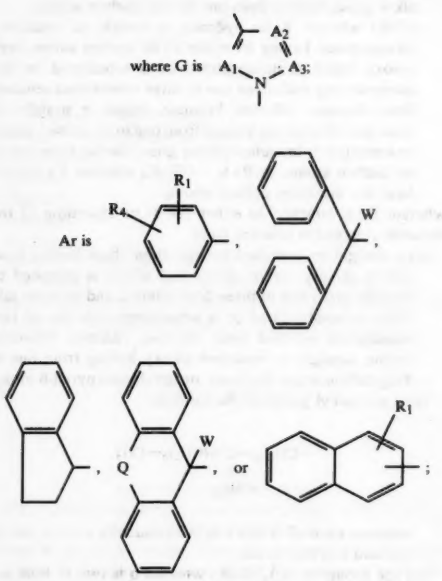
U.S. Cl. 514—381 **20 Claims**

1. A compound of the formula



I

or pharmaceutically acceptable salt or solvate thereof



A_2 is N:

A_1 and A_3 are each CH;

X is —CO—, —COHN—, —NHCO—, —CH_2CONH—, —O—, —NH—, —CH_2— or a bond;

each R_1 is independently —$(CH_2)_nR_3$;

R_2 is C_4–C_7 straight chain alkyl;

each R_3 is independently —COOH or 5-tetrazolyl;

each n is independently 0, 1, 2, 3, or 4;

R_4 is H, OH, halo, nitro, methyl, amino, acetamido, or methanesulfonamido;

Q is a bond or —O—; and

W is H, methyl, ethyl, or hydroxy.

6. A method of blocking angiotensin II receptors in mammals which comprises administering to a mammal requiring inhibition of the action of angiotensin II at its receptors a pharmaceutical amount of a compound of claim 1.

5,073,567

ANTIPARASITIC AGENT

Yasuhiro Kojima; Hiroshi Maeda; Satoshi Nishiyama, all of Aichi, Japan, and David A. Perry, Kent, England, assignors to Pfizer Inc., New York, N.Y.

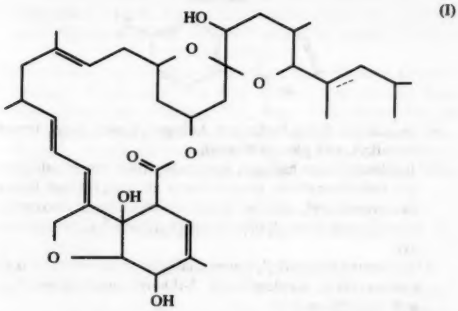
Filed Jul. 25, 1990, Ser. No. 557,885

Claims priority, application United Kingdom, Jul. 26, 1989, 8917064

Int. Cl.[5] A61K *31/365;* **C07D** *313/00*

U.S. Cl. 514—450 **5 Claims**

1. A compound having the formula:



5,073,568

ANTIPSORIATIC AGENTS

Peter M. Wovkulich, Nutley; Milan R. Uskokovic; Ann Goldstein, both of Upper Montclair, all of N.J., and John A. McLane, West Haven, Conn., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

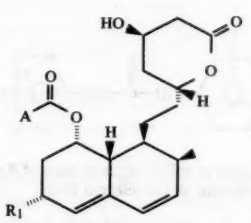
Filed Nov. 14, 1988, Ser. No. 270,980

The portion of the term of this patent subsequent to Dec. 24, 2008, has been disclaimed.

Int. Cl.[5] A61K *31/365;* **C07D** *309/10*

U.S. Cl. 514—460 **10 Claims**

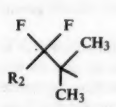
1. A compound of the formula



wherein

R_1 is hydrogen or methyl;

A is



wherein R_2 is lower alkyl.

5,073,569

PROSTAGLANDINS OF THE D SERIES, AND TRANQUILIZERS AND SOPORIFICS CONTAINING THE SAME

Ryuzo Ueno, Nishinomiya; Ryuji Ueno, Kyoto; Ichie Kato, Kawanishi, and Tomio Oda, Itami, all of Japan, assignors to K.K. Ueno Seiyaku Oyo Kenkyujo, Osaka, Japan

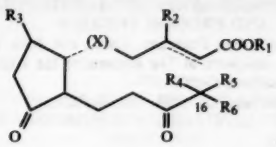
Continuation-in-part of Ser. No. 149,272, Jan. 28, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 403,774

Claims priority, application Japan, Jan. 28, 1987, 62-18821

Int. Cl.[5] C07C *177/00;* **A61K** *31/557*

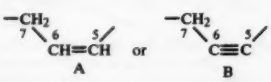
U.S. Cl. 514—530 **68 Claims**

1. A prostaglandin D represented by formula (I):



(I)

where (X) is



A B

R_1 is hydrogen, a physiologically acceptable salt residue or a physiologically acceptable alkyl ester residue;

R_2 is hydrogen or methyl;

R_3 is hydroxyl, methyl or hydroxymethyl;

R_4 and R_5, which may be the same or different, each represent hydrogen, methyl or halogen;

when at least one of R_4 and R_5 is halogen, R_6 is a C_{1-9} alkyl which may be branched or contain a double bond or is a C_{1-9} alkyl containing a C_{1-2} alkoxy substituent; or

when R_4 and R_5 are independently hydrogen or methyl, R_6 is a C_{6-9} alkyl which may be branched or contain a double bond or a C_{1-9} alkyl containing a C_{1-2} alkoxy substituent; and wherein carbons at 2–3 positions may have double bond.

5,073,570

MONO-IODOPROPARGYL ESTERS OF DICARBOXYLIC ANHYDRIDES AND THEIR USE AS ANTIMICROBIAL AGENTS

Chuen-Ing J. Tseng, Edison, N.J., assignor to Lonza Inc., Fair Lawn, N.J.

Continuation-in-part of Ser. No. 244,060, Sep. 14, 1988, abandoned. This application Feb. 16, 1989, Ser. No. 311,523

Int. Cl.[5] A61K *31/235, 31/225;* **C07C** *69/80, 67/08*

U.S. Cl. 514—533 **19 Claims**

4. Iodopropargyl phthalate.

5,073,571

METHOD OF INHIBITING VIRUS

Robert O. Heuckeroth, St. Louis; Steven P. Adams, St. Charles, and Jeffrey I. Gordon, Olivette, all of Mo., assignors to Washington University, St. Louis, Mo.

Continuation-in-part of Ser. No. 208,192, Jun. 16, 1988, which is a continuation-in-part of Ser. No. 151,774, Feb. 3, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 402,094

Int. Cl.[5] A01N *37/00*

U.S. Cl. 514—557 **9 Claims**

1. The method of inhibiting the replication of virus in a mammalian host infected with said virus comprising administering to said host a virally inhibitory effective amount of an oxy- or thio-substituted fatty acid analog substrate of myristoylating enzymes selected from the group consisting of C_{13} or C_{14} fatty acids or alkyl esters thereof in which a methylene group normally in a carbon position from 4 to 13 is replaced with oxygen or sulfur.

5,073,572

BIOACTIVE METABOLITES FROM *CRIBROCHALINA VASCULUM*

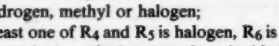
Sarath P. Gunasekera, Vero Beach; Glynn T. Faircloth; Amy E. Wright, both of Ft. Pierce; Winnie C. Thompson, Vero Beach, all of Fla., and Neal Burres, Highland Park, Ill., assignors to Harbor Branch Oceanographic Institution, Inc., Fort Pierce, Fla.

Filed Feb. 16, 1990, Ser. No. 481,475

Int. Cl.[5] C07C *33/02, 33/03;* **A61K** *31/045, 31/22*

U.S. Cl. 514—739 **21 Claims**

1. A compound, essentially pure, which can be shown by the following structure:



wherein R is selected from the group consisting of:

$-(CH_2)_{14}CH_3$;

$-(CH_2)_9CH{=}CH-(CH_2)_5-CH_3$;

$-(CH_2)_{10}-CH(CH_3)-(CH_2)_3-CH_3$;

$-(CH_2)_{13}-CH(CH_3)_2$; and,

$-(CH_2)_9-CH{=}CH-(CH_2)_4CH(CH_3)_2$;

wherein X is selected from the group consisting of H, COR_1, and benzoyl, wherein R_1 is selected from the group consisting of $-CH_3$, and $-(CH_2)_nCH_3$, wherein n is an integer from 1–10.

7. A process for inhibiting the growth of tumor or cancer cells which comprises administering an effective amount of a compound of claim 1.

15. A process for treating a human or animal in need of immunosuppression which comprises administering to said human or animal an effective immunosuppressive amount of a compound of claim 1.

5,073,573

GEL COMPOSITIONS AND COSMETIC/COMPOSITIONS CONTAINING THE SAME

Roland Martin, Weinheim, Klaus Schanz, Da-Schauernheim; and Bruno Kaufmann, Frankenthal, all of Fed. Rep. of Germany, assignors to Giulini Chemie GmbH, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 249,304

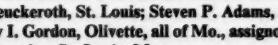
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732265

Int. Cl.[5] A61K *7/021, 7/38, 7/42, 9/12*

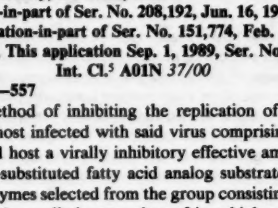
U.S. Cl. 514—844 **20 Claims**

1. A gel composition comprising:

an aluminum magnesium hydroxy compound of the formula



where R represents the anion of a monocarboxylic acid having 2 to 22 carbon atoms and x, y and z are defined by



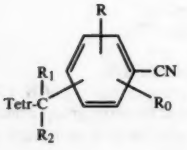
and an organic, lipophilic compound which is liquid at 20° C.

5,073,574
TETRAZOLYL SUBSTITUTED BENZONITRILES AND ANTI-TUMOR USE THEREOF

Marc Lang, Rixheim, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 10, 1990, Ser. No. 550,426
Claims priority, application Switzerland, Jul. 14, 1989, 2644/89; Jan. 30, 1990, 283/90
Int. Cl.[5] C07D *257/04;* A61K *31/41*
U.S. Cl. 514—381 14 Claims

1. A compound of formula I



wherein

Tetr is 1- or 2-tetrazolyl that is unsubstituted or substituted in the 5-position by a first-substituent selected from lower alkyl, phenyl-lower alkyl, and lower alkanoyl;

R_1 and R_2 are each independently of the other

(a) hydrogen;

(b) lower alkyl that is unsubstituted or substituted by a second-substituent selected from hydroxy, lower alkoxy, halogen, carboxy, lower alkoxycarbonyl, aminocarbonyl, lower alkylaminocarbonyl, di(lower alkyl-)aminocarbonyl, or cyano; or

(c) lower alkenyl, aryl, aryl-lower alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-lower alkyl, lower alkylthio, arylthio, or aryl-lower alkylthio;

or R_1 and R_2 together are

(a) C_{4-6} straight-chain alkylene that is unsubstituted or substituted by lower alkyl or

(b)—$(CH_2)_m$-1,2-phenylene-$(CH_2)_n$-, wherein m and n are each independently of the other 1 or 2 and the phenylene ring thereof is unsubstituted or substituted by one or two third-substituents selected from lower alkyl, lower alkoxy, hydroxy, lower alkanoyloxy, nitro, amino, halogen, trifluoromethyl, carboxy, lower alkoxycarbonyl, aminocarbonyl, lower alkylaminocarbonyl, di(lower alkyl)aminocarbonyl, cyano, lower alkanoyl, benzoyl, lower alkylsulfonyl, aminosulfonyl, lower alkylaminosulfonyl, and di(lower alkyl)aminosulfonyl or

(c) lower alkylidene that is unsubstituted or mono- or di-substituted by aryl; and

R and R_0 are each independently of the other hydrogen or lower alkyl; or

R and R_0 together, located at adjacent carbon atoms of the benzene ring, form a benzo group that is unsubstituted or substituted by one or two substituents selected from said third-substituent;

and "aryl", in each case herein, is phenyl which is unsubstituted or substituted by one or two substituents selected from said third-substituent; and wherein "lower" means up to 7 carbon atoms;

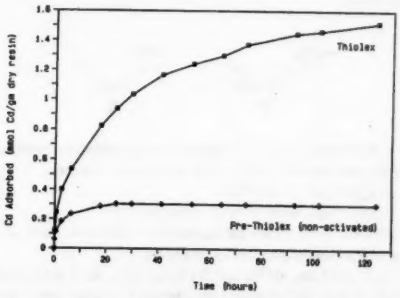
or a salt thereof.

13. A method of inhibiting aromatase activity in mammals which comprises administering to a mammal in need thereof an effective amount of a compound of formula I according to claim 1.

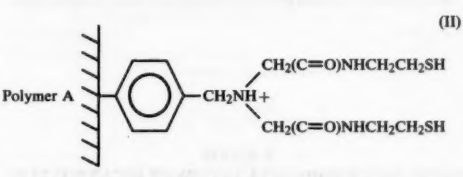
5,073,575
CADMIUM ION-CHELATING SYNTHETIC POLYMERS AND PROCESS THEREOF

Harvey W. Blanch, San Francisco, Calif., and John Yin, Kensington, Md., assignors to The Regents of the University of California, Oakland, Calif.

Filed Aug. 26, 1988, Ser. No. 237,392
Int. Cl.[5] C08F *8/28, 8/34*
U.S. Cl. 521—33 3 Claims



1. An adsorbent polymer having improved selectivity for cadmium ion in the presence of zinc ion wherein the polymeric material has a structure (II) with multiple pendent chelating groups having a thiol structure:



wherein Polymer A designates a backbone of a water-insoluble synthetic organic polymer selected from the group consisting of a styrene-divinylbenzene copolymer, a polyamide, a polyamine, a polyacrylamide, a polyester, a polyurethane, a polyethylene, a polystyrene, a polypropylene, and a polycarbonate.

5,073,576
POLYURETHANE-POLYISOCYANURATE STRUCTURAL RIM SYSTEMS WITH ENHANCED PROCESSING

Gregg S. Kuyzin, Southgate, and John R. Stoll, Woodhaven, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Jun. 28, 1990, Ser. No. 546,190
Int. Cl.[5] C08G *18/14*
U.S. Cl. 521—99 14 Claims

1. A reactive composition suitable for preparing rigid, polyurethane-polyisocyanurate, low density structural RIM parts having a density of less than 1.0 g/cm^3, comprising:

(A) an "A side" component comprising one or more polyisocyanates;

(B) A "B side" isocyanate reactive component, comprising 60 weight percent or more relative to the weight of the (B) component of isocyanate reactive compounds, and

(C) an amount of an isocyanurate promoting catalyst effective to catalyze the formation of isocyanurate linkages,

wherein said reactive components (B) comprise a minimum of about 50 weight percent of a hydroxyl-functional tertiary amine polyol wherein said hydroxyl-functional tertiary amine polyol is prepared by oxyalkylating an initiator selected from the group consisting of aryl amines, aliphatic amines, and hydroxyalkylamines wherein said (B) component further comprises a blowing agent; wherein the viscosity of said (B) com-

ponent is less than about 1000 cp, and wherein the isocyanate index calculated from the (A) and (B) components is greater than 100.

5,073,577

MIXED EMULSION OF A LIQUID POLYSULFIDE AND DISPENSION OF AN OXIDATIVE CURATIVE THEREFOR

Paul H. Anderson, Elgin, Ill., assignor to Morton International, Inc., Chicago, Ill.

Filed Jun. 11, 1990, Ser. No. 537,189

Int. Cl.[5] C08J *77/00;* **C08K** *77/00;* **C08L** *77/00*

U.S. Cl. 524—609 **9 Claims**

1. A stable mixed emulsion and dispersion comprising:

a. water as a continuous aqueous phase,

b. polysulfide emulsified with surfactant within said continuous aqueous phase and

c. particulates of an oxidative curative for said polysulfide separately dispersed with surfactant within said aqueous phase,

based upon the total weight of polysulfide, oxidative curative surfactant(s) and water, said liquid polysulfide comprising between about 50 and about 70 wt. percent, said oxidative curative comprising between about 5 and about 10 wt. percent, said surfactant(s) comprising between about 3 and about 7 wt. percent, and said water comprising at least about 20 wt. percent.

5,073,578

CORE-SHELL COPOLYMER EMULSIONS FOR FLEXIBLE COATINGS

Razmik B. Z. Boodaghains, Sutton; Colin G. Fuller, and Aloysius G. Meredith, both of Surrey, all of England, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Feb. 21, 1991, Ser. No. 658,922

Claims priority, application European Pat. Off., Feb. 23, 1990, 90301973

Int. Cl.[5] G08L *83/07;* **C08F** *275/00*

U.S. Cl. 523—201 **10 Claims**

1. A copolymer emulsion, having a Tg in the range from about 0° C. to about −30° C., comprising a core/shell structure in which the core comprises by weight:

i) from about 10% to about 60% of vinyl C1 to C4 alkanoate,

ii) from about 10% to about 30% of C2 to C4 alkylene,

iii) from about 1% to about 10% of alkyl (C2 to C12) acrylate,

iv) from about 10% to about 40% of vinyl esters having the general formula $R_1R_2R_3CCOOCHCH_2$ wherein R_1 R_2 and R_3 are each alkyl groups having at least one carbon atom and $R_1+R_2+R_3$ have from 6 to 9 carbon atoms,

v) from about 0.1% to about 5% by weight of a vinyl silane and

vi) the shell, which comprises from about 5% to about 40% by weight of the total copolymer solids, comprises vinyl C1 to C4 alkanoate at a level of at least 80%.

5,073,579

PROCESS FOR ENHANCING THE ELECTROSTATIC CHARGEABILITY OF POWDER COATINGS OF POWDERS, AND THE USE THEREOF FOR SURFACE-COATING SOLID OBJECTS

Hans-Tobias Macholdt, Darmstadt; Alexander Sieber, Frankfurt am Main; Claus Godau, Kiedrich, and Albrecht Manz, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 3, 1988, Ser. No. 266,509

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737495

Int. Cl.[5] C08K *5/18*

U.S. Cl. 524—255 **5 Claims**

1. A triboelectrically sprayable powder coating consisting essentially of a resin powder selected from the group consisting of epoxy resin, carboxyl-containing resin, hydroxyl-containing resin and acrylic resin having homogeneously distributed therein about 0.01 to 10 percent by weight of the powder at least one triarylmethane compound selected from the group consisting of Colour Index Pigment Blue 1, 1:2, 2, 3, 8, 9, 9:1, 10, 10:1, 11, 12, 14, 18, 19, 24, 53, 56, 57, 58, 59, 61, 62 or 67, Colour Index solvent Blue 2, 3, 4, 5, 6, 23, 43, 54, 66, 71, 72, 81, 124 or 125, Colour Index Basic Blue 1, 2, 5, 7, 8, 11, 15, 18, 20, 23, 26, 36, 55, 56, 77, 81, 83, 88 or 89, and Colour Index Basic Green 1, 3, 4, 9 or 10.

5,073,580

EPOXY RESIN COMPOSITION FOR USE IN SEALING SEMICONDUCTORS

Tomohisa Iinuma; Noriyuki Yamamoto, and Hideki Kato, all of Aichi, Japan, assignors to Toagosei Chemical Industry Co., Ltd., Tokyo, Japan

Filed Oct. 29, 1990, Ser. No. 604,690

Int. Cl.[5] C08K *3/30, 3/08*

U.S. Cl. 523—442 **7 Claims**

1. An epoxy resin composition for use in sealing semiconductors, which comprises an epoxy resin and an oxyacid bismuth oxyhydroxide represented by the following formula (1):

$$Bi_xO_y(OH)_p(Y^{-a})_q(NO_3)_r \cdot nH_2O \quad (1)$$

wherein Y^{-a} represents a residue of an oxyacid other than nitrate; a represents the ionic valence, absolute value of the residue of the oxyacid; and x, y, p, q, r and n each represents a value satisfying the following:

$$1 \leqq x \; 1 \leqq y \; O \leqq n$$

$$0.08\,x \leqq p \leqq 0.92\,x$$

$$0.02\,x \leqq aq \leqq 0.92\,x$$

$$0 \leqq r \leqq 0.1\,x$$

$$3\,x = 2\,y + p + aq + r$$

5,073,581

SPINNABLE DOPES FOR MAKING ORIENTED, SHAPED ARTICLES OF LYOTROPIC POLYSACCHARIDE/THERMALLY-CONSOLIDATABLE POLYMER BLENDS

Carmen A. Covelli, Wilmington, and E. Renee Perusich, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 337,504, Apr. 13, 1989, Pat. No. 5,000,898. This application Mar. 7, 1991, Ser. No. 665,757

Int. Cl.[5] C08L *1/00, 1/14, 1/12*

U.S. Cl. 524—35 **10 Claims**

1. A spinnable dope consisting essentially of fiber-forming polymers in a common solvent, at least about 55% of and less than about 80% by weight of said fiber forming polymers comprising a lyotropic polysaccharide and at least about 20% and less than about 45% by weight of said fiber-forming polymers being at least one thermally-consolidatable polymer, said lyotropic polysaccharide and said thermally-consolidatable polymers being dissolved in said common solvent to form a bi-phasic solution having an anisotropic phase and an isotropic phase, said anisotropic and isotropic phases being interdispersed to form domains with said isotropic phase having a domain size of less than about 300 microns.

5,073,582

MILDEW RESISTANT PAINT COMPOSITIONS COMPRISING AN ISOTHIAZOLONE AND A WATER-INSOLUBLE COPPER COMPOUND, ARTICLES, AND METHODS

Stanley LeSota, Horsham, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 11, 1989, Ser. No. 377,984

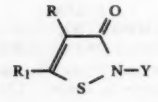
Int. Cl.[5] C08L *1/26*; C08K *5/46*

U.S. Cl. 524—44 **10 Claims**

1. In a mildew-resistant coating composition comprising:

a) a film-forming, non-wood penetrating, organic polymeric coating composition; and

b) an isothiazolone of the formula:



wherein Y is substituted or unsubstituted alkyl of 1 to 18 carbon atoms, unsubstituted or halo substituted lower alkenyl or lower alkynyl, unsubstituted or substituted cycloalkyl of 3 to 6 carbon atoms, unsubstituted or halogen, lower alkyl, or lower alkoxy-substituted aralkyl of up to 10 carbon atoms, or hydrogen, and R and R_1 are hydrogen, chloro, or methyl; the improvement comprising use of an amount of a water-insoluble, organic solvent-soluble copper compound sufficient to stabilize said isothiazolone.

5,073,583

ORGANOSILOXANE ELASTOMERS EXHIBITING IMPROVED PHYSICAL PROPERTIES

Dennis W. Broderick, Rhodes, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 202,639, Jun. 6, 1988. This application Oct. 10, 1989, Ser. No. 419,553

Int. Cl.[5] C08K *5/3472*

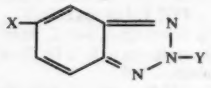
U.S. Cl. 524—91 **5 Claims**

1. A peroxide-curable organosiloxane composition comprising

A. a polydiorganosiloxane where the organic groups bonded to silicon are selected from the group consisting of monovalent hydrocarbon and halohydrocarbon radicals;

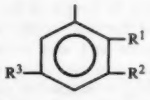
B. an amount of an organic peroxide sufficient to promote curing of said composition at temperatures at least equal to the decomposition temperature of said peroxide; and

C. a benzotriazole of the general formula



in an amount sufficient to improve the physical properties of the cured elastomer while simultaneously imparting a resistance to ultraviolet-induced degradation,

where X is a chlorine atom and Y represents a substituted phenyl radical of the formula



and where R^1 represents hydroxyl or hydroxyalkyl containing from 1 to 4 carbon atoms, R^2 represents a tertiary alkyl radical containing from 4 to 6 carbon atoms and R^3 is selected from the group consisting of R^2 and a hydrogen atom.

5,073,584

PROCESSING ADDITIVE FOR HALOGEN-CONTAINING POLYMERS

Peter Meszaros, Villach, and Peter Stern, Arnoldstein, both of Austria, assignors to Chemson Polymer-Additive Gesellschaft m.b.H., Arnoldstein, Austria

Filed Dec. 18, 1989, Ser. No. 452,161

Claims priority, application Austria, Dec. 19, 1988, 3088/88

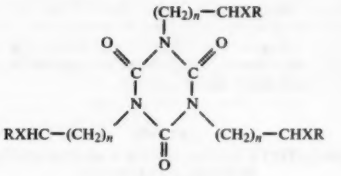
Int. Cl.[5] C08K *34/92*, *5/15*, *5/04*

U.S. Cl. 524—101 **19 Claims**

1. A process additive for halogen-containing polymers comprising the combination of

a synthetic, crystalline finely-particulate alkali metal aluminosilicate of the formula $(0.7–1.1)\ Me_2O.Al_2O_3\times(1.3–2.4-)SiO_2$ containing 13 to 25 percent by weight of bound water, wherein Me is an alkali metal, and

at least one isocyanuric derivative of the formula



wherein

each n is independently an integer from 0 to 5,

each X is independently H or a straight or branched alkyl group containing 1 to 6 carbon atoms, and

each R is independently —OH or —COOH.

5,073,585

AQUEOUS COATING MATERIALS BASED ON SECONDARY DISPERSIONS OF CARBOXYL-CONTAINING COPOLYMERS OF ACRYLATES OR METHACRYLATES

Gerhard Neubert, Battenberg, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,398

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727112

Int. Cl.[5] C08K *5/51*

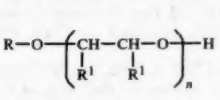
U.S. Cl. 524—139 **8 Claims**

1. An aqueous coating material, which contains

(A) an aqueous secondary dispersion of a carboxyl-containing copolymer of an acrylate or methacrylate having an acid number of from 15 to 150 and a K value of from 22 to 50, as the binder,

(B) not less than 5% by weight, based on the solids content of the binder (A), of pigments, and mixtures thereof, each of which contains a calcium compound or magnesium compound, and

(C) 0.1–10% by weight, based on the components (B), of a monoester of phosphoric acid whose alcohol component is derived from a compound of the formula



where R is C_4–C_{24}-alkyl, phenyl or C_1–C_{18}-alkylphenyl, R^1 is H, CH_3 or C_2H_5 and n is from 1 to 50, as a dispersant, the volume concentration of the components (B) being

from 2 to 70% by volume, based on the solids of (A) and (B).

5,073,586

FILLED COMPOSITIONS

Michelle M. N. C. Berthet, Brussels, Belgium; Brian R. Trego, Dinas Powys, Wales, and Hans-Juergen Wessely, Nivelles, Belgium, assignors to Dow Corning S.A., Seneffe, Belgium

Continuation of Ser. No. 259,384, Oct. 18, 1988, abandoned. This application Apr. 20, 1990, Ser. No. 511,879

Claims priority, application United Kingdom, Oct. 24, 1987, 8724958

Int. Cl.[5] C08K *5/41*

U.S. Cl. 524—159 **10 Claims**

1. A nonaqueous composition comprising 100 parts by weight of polysiloxane, 50 to 200 parts by weight of finely divided filler having an average particle size greater than 0.05 micron selected from the group consisting of a metal oxide, hydroxide, carbonate, or bicarbonate of calcium, magnesium, barium, or zinc, or a mixture thereof, and not less than 0.5 parts by weight per 100 parts by weight of the filler of an additive consisting of a reaction product of an organic amine, or a metal oxide, hydroxide, carbonate, or bicarbonate or a mixture thereof with a sulphonic acid of the formula RSO_3H in which r represents a hydrocarbon group which may have halogen or amino substituents and which contains not less than six carbon atoms, with the proviso that if any filler having an average particle size less than 0.05 micron is present it must be less than the amount of filler present which has an average particle size greater than 0.05 micron.

5,073,587

POLYMERIC COMPOSITION AND METHOD OF PRODUCING SAME

Bill R. Edwards, 10311 Merton St., Wichita, Kans. 67209

Filed Jan. 16, 1990, Ser. No. 464,945

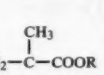
Int. Cl.[5] C08K *5/42*

U.S. Cl. 524—166 **20 Claims**

1. A particulate containing polymeric composition curable at atmospheric pressure and at ambient temperature and having a pour to pull time of less than about 4 hours, the particulate containing polymeric composition comprising, based on the total weight of the polymeric composition:

from about 15 to about 88 parts by weight of a polymerization syrup consisting essentially of:

from about 300 to about 1000 parts by volume of an acrylic monomer represented by the formula



wherein R is an alkyl moiety containing 1 to about 18 carbon atoms;

from about 0.01 to about 1 part by volume of 2,2-bis(allyloxymethyl)-butan-1-ol;

from about 0.5 to about 5 parts by volume of a mercaptan; and

from about 0.3 to about 40 parts by volume of a crosslinking agent compatible with the acrylic monomer;

from about 12 to about 90 parts by weight of a particulate filler;

from about 0.001 to about 0.01 parts by weight of a crosslinking agent;

from about 0.001 to about 0.1 parts by weight of a polymerization catalyst;

from about 0.001 to about 0.1 parts by weight of a quaternary compound; and

from about 0.01 to about 0.02 parts by weight of a polymerization initiator compatible with acrylic monomer and capable of crosslinking the mercaptan and the acrylate moieties present in the polymerization syrup.

5,073,588

GLYCIDOXYPROPYL SILANOL AND POLYDIMETHYL SILOXANES AS MOLD RELEASE AGENTS

Hans-Guenter Seltmann; Juergen Haerer, and Hans-Josef Hoffmann, all of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 238,703

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1987, 3729039

Int. Cl.[5] C08K *5/24*

U.S. Cl. 524—264 **3 Claims**

1. A mold release composition substantially free from organic solvents in the form of an aqueous emulsion, solution, or suspension comprising

A. from about 0.5 to about 3% by weight of glycidoxypropyl silanol, and

B from about 0.2 to about 2% by weight of an aqueous silicone latex containing from about 25 to about 55% by weight of a polydimethyl siloxane having a number average molecular weight of more than 100,000.

5,073,589

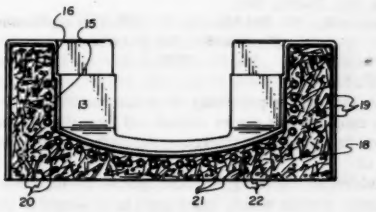
COMPOSITE BACKING STRUCTURE FOR SPRAY METAL TOOLING

Dimitrije Milovich, 1611 S. 1600 East, Salt Lake City, Utah 84105, and Ronald H. Nelson, 2154 S. 1900 East, Salt Lake City, Utah 84106

Filed Dec. 21, 1989, Ser. No. 454,511

Int. Cl.[5] C08K *3/08, 3/04*

U.S. Cl. 524—439 **5 Claims**



1. A backing material for a thin metal-faced composite tool comprising, a thermoset resin selected as a backing for a thin metal-faced composite tool at its anticipated operating temperature and pressure; and a mix of very small and larger low aspect fibers that have been chemically treated by an acid or alkaline etch, to clean and pit the surfaces thereof are combined with said resin, where the ratio of said resin to fibers is from five percent (5%) to forty-five percent (45%) with a density of fifteen (15) lbs/ft^3 to one hundred fifty (150) lbs/ft^3, and the mix is poured into a thin metal shell, said resin polymerizing therein to form said backing for said thin metal-faced composite tool that is isotropic and exhibits a low coefficient of thermal expansion.

5,073,590

THEMOPLASTIC RESIN COMPOSITION AND PROCESS FOR PRODUCING THE SAME

Hiroomi Abe; Taichi Nishio, both of Chiba; Kiyoshi Mitsui, Ichihara; Satoru Sogabe, Chiba, and Takashi Sanada, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 418,203, Oct. 6, 1989, abandoned. This application May 7, 1991, Ser. No. 698,337

Claims priority, application Japan, Oct. 15, 1988, 63-260297

Int. Cl.[5] C08L *77/00;* **C08K** *3/00*

U.S. Cl. 524—449 **10 Claims**

1. A thermoplastic resin composition comprising

100 parts by weight of a resin blend consisting of 10 to 90%

by weight of at least one polypropylene resin (A) selected from the group consisting of modified polypropylene and compositions consisting of modified polypropylenes and polypropylenes, and 90 to 10% by weight of a polyamide resin (B);

2 to 30 parts by weight of an epoxy group containing copolymer (C); and

2 to 100 parts by weight of an ethylene-α,β-unsaturated carboxylic acid alkyl ester-maleic anhydride terpolymer (D),

wherein the modified polypropylene is a polypropylene modified by grafting with 0.01 to 10 parts by weight of an unsaturated carboxylic acid or the derivative thereof or with 0.01 to 10 parts by weight of an unsaturated carboxylic acid or the derivative thereof and 0.01 to 10 parts by weight of an unsaturated aromatic monomer per 100 parts by weight of the polypropylene.

5,073,591

POLYMERIC THICKENERS AND METHODS OF PRODUCING THE SAME

Sheng-Liang Tsaur, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Division of Ser. No. 384,360, Jul. 21, 1989. This application Sep. 17, 1990, Ser. No. 583,411

Int. Cl.[5] C08L *9/06*

U.S. Cl. 524—460 **1 Claim**

1. A method for producing an acidic, concentrated, polymeric emulsion that can be diluted and thereafter neutralized to provide a polymeric thickener, the method comprising the steps of:

emulsion polymerizing, in acidic aqueous media, a first monomer mixture which, based upon total weight of the first monomer mixture, comprises 30–60 wt.-% of an acidic moiety-containing emulsion-polymerizable monomer and an ethylenically-unsaturated emulsion-polymerizable monomer copolymerizable with the acidic moiety-containing monomer and selected from the group consisting of a mono vinylidene aromatic monomer, an alpha beta ethylenically-unsaturated carboxylic acid ester and its derivatives, a vinyl ester and its derivatives, an ethylenically-unsaturated dicarboxylic anhydride and its derivatives, and mixtures thereof, at predetermined reaction conditions, for producing an alkali-soluble dispersion in said acidic aqueous media;

adding to the alkali-soluble dispersion-containing acidic aqueous media a second monomer mixture which comprises said ethylenically-unsaturated monomer and an amino moiety-containing emulsion-polymerizable monomer that is copolymerizable with said ethylenically-unsaturated monomer;

emulsion-polymerizing the aqueous media-contained second monomer mixture in the presence of the alkali-soluble dispersion, while maintaining acidic conditions of the aqueous media, for producing the concentrated polymeric emulsion;

diluting the concentrated polymeric emulsion; and

adding an effective amount of an alkali to the thus-diluted polymeric emulsion for dissolving at least a portion of the emulsion-polymer particles, for thereby increasing the polymeric emulsion viscosity.

5,073,592

PROCESS FOR THE PREPARATION OF A RUBBER HAVING POLYMER BOUND FUNCTIONALITY

Gerald O. Schulz, Stow, and Dane K. Parker, Massillon, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 2, 1990, Ser. No. 562,052

Int. Cl.[5] C08K *5/36*

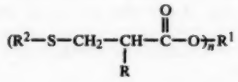
U.S. Cl. 524—750 **13 Claims**

1. A process for forming a rubber comprising the aqueous emulsion polymerization of:

(a) at least one functionalized monomer that contains an antidegradant moiety and a polymerizable vinyl group; with

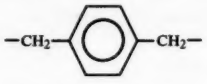
(b) at least one copolymerizable conjugated diene monomer selected from the group consisting of butadiene-1,3, 2-chlorobutadiene-1,3, isoprene, piperylene and conjugated hexadienes;

wherein the polymerization is conducted in the presence of about 1 to about 70 parts by weight of an ester based on 100 parts by weight of total monomers; said ester having the following structural formula:



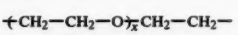
(I)

wherein n is an integer from 1 to 4, wherein R is selected from the group consisting of hydrogen and methyl, wherein when n is 1, R^1 is selected from the group consisting of alkyl radicals having from 1 to 18 carbon atoms, aryl radicals having from 6 to 12 carbon atoms, aralkyl radicals having from 7 to 12 carbon atoms and cycloalkyl radicals having from 5 to 12 carbon atoms wherein when n is 2, R^1 is selected from the group consisting of alkylene radicals having from 2 to 18 carbon atoms, cycloalkylene radicals having from 5 to 12 carbon atoms, arylene radicals having from 6 to 12 carbon atoms,



polyalkyl glycol ether radicals having the following structure:

wherein x is an integer from 1 to 7, a thioether radical having the following structure:



wherein when n is 3 or 4, R^1 is an aliphatic hydrocarbon radical having the formula C_yH_{2y+2-n}, wherein y is an integer from 3 to 6 and wherein R^2 is selected from the group consisting of alkyl radicals having from 1 to 24 carbon atoms, aryl radicals having from 6 to 12 carbon atoms and aralkyl radicals having from 7 to 12 carbon atoms.

5,073,593

METHOD FOR MAKING MICROEMULSIONS OF ORGANOPOLYSILOXANES CONTAINING CYCLOHEXYLAMINO GROUPS

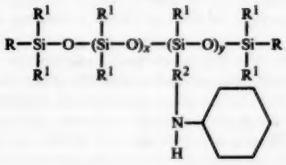
Masaru Ozaki, Ichihara, and Isao Ona, Chiba, both of Japan, assignors to Dow Corning Toray Silicone Company, LTD., Tokyo, Japan

Filed Jun. 13, 1990, Ser. No. 537,545
Claims priority, application Japan, Jun. 19, 1989, 1-156082
Int. Cl.[5] C08K 5/05
U.S. Cl. 524—767 1 Claim

1. A method for making microemulsions comprising an organopolysiloxane containing cyclohexylamino groups, wherein the method for making the microemulsions comprises

(I) forming a mixture from the following components:

(A) 100 parts by weight of an organopolysiloxane containing cyclohexylamino groups and represented by the following formula:



wherein each R is independently selected from a univalent hydrocarbon group, hydroxyl group, and alkoxy group; each R^1 is independently selected from a univalent hydrocarbon group; R^2 is selected from an alkylene group; x has a value of 50–2000; and y has a value of 2–100;

(B) 10–100 parts by weight of a nonionic surfactant;

(C) 10–50 parts by weight of ethylene glycol or propylene glycol;

(II) adding to mixture (I)

(D) 0.1–5 parts by weight of formic acid or acetic acid; and

(E) water in an amount less than twice the amount of said component (B);

(III) stirring said mixture (II) to form an emulsion precursor liquid; and

(IV) dispersing the liquid from (III) in 100–1500 parts by weight of water.

5,073,594

MODIFIED POLYPROPYLENE POWER SUSPENDED IN FILM-FORMING RESIN

Richard L. Brook, Harvard, Ill., assignor to Morton International, Inc., Chicago, Ill.

Continuation of Ser. No. 53,439, May 19, 1987, abandoned, which is a continuation of Ser. No. 894,081, Aug. 19, 1986, abandoned, which is a continuation of Ser. No. 681,153, Dec. 13, 1984, abandoned. This application Jan. 29, 1990, Ser. No. 471,914
Int. Cl.[5] C08L 23/26, 62/02
U.S. Cl. 525—65 14 Claims

1. A primer composition consisting essentially of a homogeneous, fluid, uncured suspension of discrete particles of a polar group-containing modified propylene polymer in a film forming resin material, the particles having an average particle size of less than about 5 microns, and the primer composition containing less than about 5% of a solvent for the polar group-containing modified propylene polymer based upon the weight of said modified propylene polymer.

5,073,595

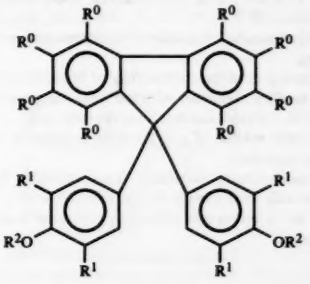
EPOXIDE RESIN COMPOSITIONS AND METHOD

Carl J. Almer, Shoreview, and William J. Schultz, Vadnais Heights, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 284,903, Dec. 15, 1988, Pat. No. 4,980,234, which is a continuation-in-part of Ser. No. 137,453, Dec. 19, 1987, Pat. No. 4,983,672. This application Oct. 1, 1990, Ser. No. 591,478
Int. Cl.[5] C08G 39/24
U.S. Cl. 525—65 17 Claims

1. A method of improving a glass transition temperature and ductility of a cured product from an epoxy resin composition; said method including the steps of:

(a) providing in said epoxy resin composition an effective amount of a diepoxide composition according to the general formula:



wherein: each R^0 and R^1 is independently selected from hydrogen and other groups substantially inert to polymerization of epoxide group-containing compounds; and, each R^2 is an epoxy functionalized alkyl group capable of reacting through the epoxy group to from an epoxy resin; and,

(b) providing in said epoxy resin composition an elastomer toughening agent.

5,073,596

POLYPHENYLENE ETHER RESIN COMPOSITION

Takayuki Inoue; Kouji Nishida; Keiichi Saito; Kazunobu Nakamori; Takefumi Uematsu, and Takeyuki Uchida, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Dec. 7, 1989, Ser. No. 447,539
Claims priority, application Japan, Dec. 12, 1988, 63-311973
Int. Cl.[5] C08L 33/00, 35/00, 53/02, 71/12
U.S. Cl. 525—92 8 Claims

1. A resin composition, used for extrusion molding or blow molding process, having a melt flow rate (MFR) of 0.01–5 dg/min. and a melt tension (MT) of at least 4 g. which comprises:

10–60 parts by wt. of polyphenylene ether having an intrinsic viscosity [η] of 0.35–0.75 dl/g measured n in chloroform at 30° C.;

90–40 parts by wt. of polyamide having a relative viscosity (ηr) of at least 4.0 (measured in 98%H_2SO_4 according to JIS K6810);

0.1–30 parts by wt. of rubber-like material relative to the total amount of 100 parts by wt. of polyphenylene ether and polyamide;

0.01–30 parts by wt. of compatibilizing agent, relative to the total amount of 100 parts by wt. of polyphenylene ether, polyamide and rubber-like material, said compatibilizing agent being selected from chemical compounds simultaneously having a carbon—carbon double bond or carbon—carbon triple bond, and a carboxyl group, acid anhydride group, acid amide group, imide group, carbox-

ylate group, amino group, or hydroxyl group, or mixture thereof;

0.01–30 parts by wt. of melt tension modifier relative to the total amount of 100 parts by wt. of polyphenylene ether, polyamide and rubber-like material, said modifier being selected from organic compounds containing oxirane oxygen.

5,073,597

DYNAMICALLY VULCANIZED ALLOYS HAVING TWO COPOLYMERS IN THE CROSSLINKED PHASE AND A CRYSTALLINE MATRIX

Robert C. Puydak, Cranbury; Donald R. Hazelton, Chatham, both of N.J., and Trazollah Ouhadi, Liege, Fed. Rep. of Germany, assignors to Advanced Elastomer Systems, L. P., St. Louis, Mo.

Filed May 26, 1989, Ser. No. 359,060

Int. Cl.[5] C08L *15/02, 23/16, 23/26, 9/00;* **C08J** *3/24*

U.S. Cl. 525—193 **17 Claims**

1. A dynamically vulcanized thermoplastic composition comprising:

(a) a primary elastomer consisting of bromobutyl rubber;

(b) a secondary elastomer selected from the group consisting of EPM, EPDM and mixtures thereof; and

(c) a plastic matrix of a crystalline polyolefin comprising polypropylene;

wherein said primary elastomer is substantially fully cured with a peroxide cure system in combination with a maleimide co-agent; and wherein said secondary elastomer is substantially fully cured.

5,073,598

METHOD FOR IMPROVING THE PROCESSING CHARACTERISTICS OF POLYETHYLENE BLENDS

David J. Anzini, Sodus, N.Y., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Jun. 21, 1989, Ser. No. 369,170

Int. Cl.[5] C08L *23/26, 51/06;* **C08J** *5/18*

U.S. Cl. 525—193 **18 Claims**

1. A method for improving the processing characteristics of a polyethylene blend wherein the blend is comprised of at least two polyethylene components of dissimilar melt indices, comprising the steps of:

(a) establishing a functional relationship between free radical generator dosage and melt index for at least one polyethylene component of the polyethylene blend;

(b) determining a free radical generator dosage from said relationship for use with at least one polyethylene component, said dosage level sufficient to enable the polyethylene component so treated to exhibit a melt index substantially similar to that of all components present in the blend;

(c) treating at least one polyethylene component at the dosage of free radical generator determined in step (b); and

(d) blending the polyethylene components in melt form.

5,073,599

FILMS USING BLENDS OF POLYPROPYLENE AND POLYISOBUTYLENE

Roger P. Genske, Neenah, Wis., assignor to American National Can Company, Chicago, Ill.

Division of Ser. No. 114,652, Jan. 11, 1988, Pat. No. 4,892,911, which is a continuation of Ser. No. 803,029, Nov. 29, 1985, abandoned. This application Jun. 13, 1988, Ser. No. 205,697

Int. Cl.[5] C08L *23/16, 23/20*

U.S. Cl. 525—240 **4 Claims**

1. In a polymeric film comprising polypropylene and polyisobutylene wherein the improvement comprises said film being unstretched and consisting essentially of a blend which consists essentially of 19.5 to 40% by weight polyisbutylene and 80.5 to 60% by weight of a polypropylene copolymer having 70 to 98 mole % propylene moieties and 30 to 2% ethylene moieties, with the overall composition of the blend having at least about 1.8 mole % ethylene.

5,073,600

DISPERSANT VISCOSITY INDEX IMPROVERS

John Eugene Gorman, Houston, and John A. Morris, Katy, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 12, 1989, Ser. No. 420,974

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.[5] C10M *149/00, 145/10;* **C08F** *8/32*

U.S. Cl. 525—264 **21 Claims**

1. A process to produce an aminated polymer comprising the steps of:

(a) producing a functionalized polymer by grafting an alpha-beta unsaturated carboxylic moiety selected from the group consisting of acids, anhydride and ester, to a base polymer selected from the group consisting of (i) selectively hydrogenated block copolymer consisting essentially of one or more blocks comprising predominantly conjugated diolefin monomer units, and one or more block comprising predominantly monoalkenyl arene monomer units, and (ii) hydrogenated polymers consisting essentially of conjugated diolefin monomer units, where the functionalization is performed in a device capable of imparting high mechanical energy and is performed in the presence of between about 3.0% and about 15% by weight based on the amount of base polymer of a diluent oil;

(b) reacting the functionalized polymer with an amine to form an aminated polymer; and

(c) recovering the aminated polymer.

5,073,601

COMPOSITION OF BUTADIENE/POLAR COMONOMER COPOLYMER, AROMATIC REACTIVE END GROUP-CONTAINING PREPOLYMER AND EPOXY RESIN

Rolf Mülhaupt, and Werner Rüfenacht, both of Marly, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 25, 1989, Ser. No. 384,958

Claims priority, application Switzerland, Jul. 28, 1988, 2869/88

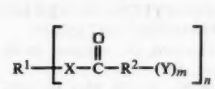
Int. Cl.[5] C08L *9/02, 63/02, 71/02*

U.S. Cl. 525—109 **18 Claims**

1. A composition comprising

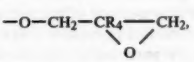
A) a liquid copolymer based on butadiene and at least one polar, ethylenically unsaturated comonomer;

B) a prepolymer of formula I:

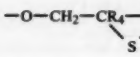


(I)

wherein m is 1 or 2, n is 2 to 6, X is —O—, —S— or —NR^3—, Y is a radical selected from the group consisting of —OH, —NHR^3, —OH reacted with a cyanogen halide to introduce —OCN, —OH reacted with an epichlorohydrin to introduce



and —OH reacted with an epichlorohydrin to introduce an epoxide which is reacted with potassium thiocyanate or thiourea to introduce



R^1 is a radical of a polyether, prepolymer with hydroxyl mercapto or amino end groups or of a segmented polyester, polythioester or polyamide prepolymer with hydroxyl, mercapto or amino end groups, containing at least +mol%, based on said segmented prepolymer, of polyether segments after removal of the functional end groups, R^2 is a carbocyclic aromatic or araliphatic radical of valency m+1 with groups Y bonded directly to the aromatic ring, R^3 is hydrogen, C_1–C_6-alkyl or phenyl and R^4 is methyl or hydrogen;

C) an epoxy resin with at least two 1,2-epoxy groups per molecule; and

D) an effective amount of a hardener based on an aromatic polyamine with at least two primary or secondary amino groups or an aromatic polyamine with at least two primary and secondary amino groups or an amidine.

5,073,602

THERMOSETTING RESIN COMPOSITION

Yasushi Nakao; Mitsuhiro Fukuda, and Motoshi Yabuta, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Mar. 20, 1991, Ser. No. 671,927
Claims priority, application Japan, Mar. 20, 1990, 2-68191
Int. Cl.[5] C08L *61/00, 61/20, 33/02;* **C08K** *5/07*
U.S. Cl. 525—155 **15 Claims**

1. A thermosetting resin composition comprising as main components

(A) an acrylic resin containing in the molecule a carboxyl group, a hydroxyl group and an epoxy group and having an acid value of 15–150 mg KOH/g, a hydroxyl value of 30 mg KOH/g or more, an epoxy equivalent of 3,000–15,000 and a number-average molecular weight of 3,000–30,000,

(B) an acrylic resin containing in the molecule a carboxyl group, a hydroxyl group and an epoxy group and having an acid value of 2–10 mg KOH/g, a hydroxyl value of 30 mg KOH/g or more, an epoxy equivalent of 250–2,500 and a number-average molecular weight of 3,000–30,000 and

(C) an amino resin,

wherein the molar ratio of the carboxyl group of the component (A)/the epoxy group of the component (B) is 1/0.5 to 0.5/1 and the amount of the component (C) is 10–40% by weightbased on the total amount of the components (A) to (C).

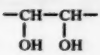
5,073,603

METHOD OF USING DITHIOTHREITOL AS A CROSSLINKING AGENT FOR ELECTROPHORESIS MEDIA

Ignazio S. Ponticello, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 339,350, Apr. 18, 1989, abandoned. This application Nov. 2, 1989, Ser. No. 430,996
Int. Cl.[5] C08F *8/34*
U.S. Cl. 525—350 **19 Claims**

1. A method of crosslinking a copolymer consisting essentially of a water soluble vinyl addition copolymer derived from a mixture of monomers comprising from 85–98 mole percent a monomer selected from acrylamide and N-substituted acrylamides wherein the N-substituent is an alkyl group having from 1 to 5 carbon atoms, from 2 to 15 mole percent of a vinyl monomer having a haloacetyl reactive group; and from 0 to 12 mole percent of one or more other polymerizable nonionic vinyl monomers selected from styrene monomers, acrylic monomers, methacrylamide monomers and N-substituted acrylamide monomers wherein the substitutent contains at least 6 carbon atoms which method comprises mixing an aqueous solution of said water soluble copolymer with a crosslinking agent that is a bis mercaptan having in its backbone chain the



group selected from dithiothreitol or dithioerythritol.

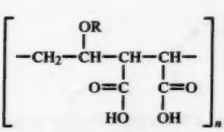
5,073,604

DENTURE STABILIZING COMPOSITIONS

Kenneth T. Holeva, Waterbury, and Michael C. Gounaris, Huntington, both of Conn., assignors to Richardson-Vicks, Inc., Shelton, Conn.

Continuation of Ser. No. 347,318, May 4, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 492,277
Int. Cl.[5] C08F *8/44;* **A61K** *6/00*
U.S. Cl. 525—327.8 **26 Claims**

1. The mixed partial salt of a lower alkyl vinyl ether-maleic acid copolymer consisting essentially of the repeated structural unit:



(I)

wherein R represents a C_1 to C_4 alkyl radical, n is an integer greater than one representing the number of repeated occurrences of said structural unit in a molecule of said copolymer and n is large enough to characterize said copolymer as having a specific viscosity larger than 1.2, the specific viscosity being determined in methyl ethyl ketone at 25° C., said partial salts containing as the cationic salt function:

(a) from about 10% to about 65% zinc or strontium cations; and

(b) from about 10% to about 75% calcium cations of the total initial carboxyl groups reacted.

5,073,605

BROMINE-BISPHENOL REACTED BISPHENOL AND NOVOLAK EPOXY RESINS WITH POLYPHENYLENE ETHER

John E. Hallgren, Scotia, and Victoria J. Eddy, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 219,102, Jul. 14, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,401
Int. Cl.[5] C08L *63/02, 63/04, 71/04*
U.S. Cl. 525—396 **14 Claims**

1. A resinous blend containing 5–10% chemically combined bromine and comprising (I) about 35–60% of a composition comprising the reaction product obtained by heating at a temperature in the range of about 125°–225° C., in the presence of a catalytic amount of at least one basic reagent, a mixture comprising:

(A) at least one halogen-free bisphenol diglycidyl ether having an average of at most one aliphatic hydroxy group per molecule;

(B) about 15–25% of at least one halogen-free epoxidized novolak; and

(C) 25–35% of at least one bisphenol containing bromine as aryl substituents; said percentages of B and C being by weight of total reagents A, B and C,

(II) about 40–65% of at least one polyphenylene ether, and

(III) about 4–10% of at least one polyepoxy compound selected from the group consisting of halogen-free di-

glycidyl ethers having an average of at most one aliphatic hydroxy group per molecule and halogen-free epoxidized novolaks, said percentages of (I), (II) and (III) being by weight of total resinous components.

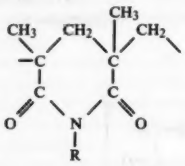
5,073,606

METHACRYLIMIDE CONTAINING POLYMER

Isao Sasaki, Otake; Kozi Nishida, Toyama, and Hisao Anzai, Otake, all of Japan, assignors to Mitsubishi Rayon Company, Limited, Tokyo, Japan

Continuation of Ser. No. 461,337, Dec. 28, 1989, abandoned.
This application Apr. 15, 1991, Ser. No. 684,504
Claims priority, application Japan, Dec. 29, 1988, 63-334725
Int. Cl.[5] C08F 8/32
U.S. Cl. 525—330.5 4 Claims

1. A methacrylimide containing polymer comprising from 2 to 100% by weight of a structural unit represented by the general formula (I):



where R represents a hydrogen atom or an aliphatic group, aromatic group or cycloaliphatic hydrocarbon group with 1 to 20 carbon atoms and from 0 to 98% by weight of a structural unit derived from an ethylenic monomer, the polymer having:

(a) a molecular weight (Mw) of greater than 50,000 and less than 200,000 as measured by GPC,

(b) an amount of amide segments in the polymer of less than 5% by weight,

(c) a yellowness index (YI_0) of 3 or below,

(d) a yellowness degree (ΔYI) of 3 or below,

(e) an iron content in the polymer of less than 20 ppm, and

(f) a content of fine particles sized from 0.5 μm to 25 μm in the polymer as measured by a fine particle counter of less than 50,000/g of the polymer,

said polymer having been prepared by a process wherein

an inert gas is introduced into methyl methacrylate or a mixture of methyl methacrylate and an ethylenic monomer copolymerizable with the methyl methacrylate to reduce the amount of dissolved oxygen,

polymerization or copolymerization of methyl methacrylate, imidization of the polymer or copolymer of methyl methacrylate to form a methacrylimide containing polymer, and separation of volatile materials from the methacrylimide containing polymer are carried out continuously.

5,073,607

POLYIMIDE COMPOSITIONS CONTAINING POLYORGANOSILOXANE FOR IMPROVING ATOMIC OXYGEN RESISTANCE

Morton Katz, Columbus, Ohio, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 15, 1989, Ser. No. 407,607
Int. Cl.[5] C08L 77/00
U.S. Cl. 525—431 16 Claims

1. A polyimide composition having improved oxygen resistance comprising

(i) a polyimide formed by reaction of a substantially equimolar amount of (a) at least one aromatic dianhydride and (b) at least one diamine and

(ii) a polyorganosiloxane of the formula

$$[R_1SiO[_m[R_1SiO3/2]_n$$

wherein R_1 is lower alkyl having 1–10 carbons, substituted alkyl, aryl, substituted aryl, vinyl or hydrogen; R_2 is lower alkyl having 1–10 carbons, or aryl; and where one of m or n is 0 and the other of m or n is 2–1000 or where m or n is not 0 and m and n are both 2–1000.

5,073,608

BLADDER LUBRICANT COMPOSITION FOR TIRE MOLDING

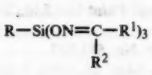
Isao Ona, Kimitsu, and Tsutomu Naganawa, Ichihara, both of Japan, assignors to Dow Corning Toray Silicone Company, Ltd., Tokyo, Japan

Filed May 9, 1990, Ser. No. 521,206
Claims priority, application Japan, May 25, 1989, 1-132496
Int. Cl.[5] C08F 283/00
U.S. Cl. 525—477 10 Claims

1. A composition comprising:

(A) about 50 to 90 weight percent of an organopolysiloxane resin consisting essentially of about 10 to 90 weight percent $Ph\text{-}SiO_{3/2}$ siloxane units, in which Ph denotes a phenyl group, and about 90 to 10 weight percent $(CH_3)_2SiO_{2/2}$ siloxane units;

(B) about 2 to 35 weight percent of an organosilane selected from the group consisting of an organosilane represented by the formula



and an organosilane represented by the formula

$$R\text{—}Si(OR^1)_3$$

wherein R, R^1 and R^2 in the above formulas are monovalent hydrocarbon groups;

(C) about 0.1 to 10 weight percent of a condensation catalyst; and

(D) up to about 30 weight percent of at least one diorganopolysiloxane having terminal groups selected from the group consisting of hydroxyl and alkoxy groups.

5,073,609

DNA SEQUENCE CODING FOR PROTEIN C

Donald C. Foster, Seattle, and Earl W. Davie, Bellevue, both of Wash., assignors to The Board of Regents of the University of Washington, Seattle, Wash.

Division of Ser. No. 766,109, Aug. 15, 1985, Pat. No. 4,968,626.
This application Jun. 29, 1989, Ser. No. 375,260
The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.
Int. Cl.[5] C07H 15/12
U.S. Cl. 536—27 2 Claims

1. An isolated DNA sequence encoding the heavy chain of human protein C.

5,073,610

POLYMERS OF ALKOXYSTYRENES AND A PROCESS TO PRODUCE POLYMERS OF ALKOXYSTYRENES

Donn A. DuBois, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 28, 1990, Ser. No. 589,364
The portion of the term of this patent subsequent to Nov. 26, 2008, has been disclaimed.
Int. Cl.[5] C08F 4/16
U.S. Cl. 526—194 20 Claims

1. A process to polymerize alkoxystyrenes comprising the steps of:

a) contacting an alkoxystyrene monomer with a zeolite under polymerization conditions; and

b) recovering an alkoxystyrene polymer.

5,073,611

COPOLYMERS CROSSLINKABLE BY ULTRAVIOLET RADIATION IN THE ATMOSPHERE

Gerd Rehmer, Beindersheim, and Andreas Boettcher, Nussloch, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 505,989, Apr. 6, 1990, abandoned. This application Apr. 29, 1991, Ser. No. 692,796

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1989, 3914374

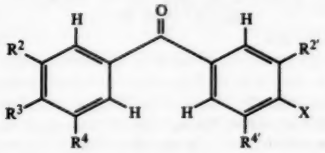
Int. Cl.[5] C08F *2/48, 2/50, 212/02*

U.S. Cl. 526—208 **18 Claims**

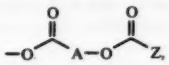
1. A process for the preparation of a copolymer which is crosslinkable by ultraviolet radiation in the air, wherein a mixture of

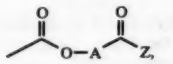
(A) from 80 to 99.9% by weight of the polymer of olefinically unsaturated monomers, comprising at least one member from the group consisting of (meth)acrylates of alkanols of 1 to 24 carbon atoms, vinyl esters of saturated carboxylic acids of 1 to 20 carbon atoms, vinyl ethers of 3 to 22 carbon atoms, vinyl aromatics of 8 to 12 carbon atoms, halo styrenes, monoolefins of 2 to 20 carbon atoms; butadiene, vinyl chloride, and vinylidene chloride;

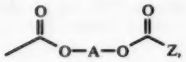
(B) from 0.01 to 10% by weight of the polymer of copolymerizable, olefinically unsaturated photoreactive compound which, in the excited state produced by UV radiation, is capable of abstracting hydrogen, having the formula:

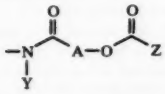


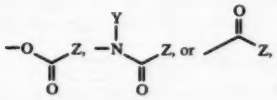
where X is



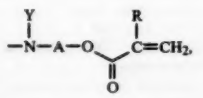








Z is



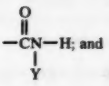
Y is H or C_1–C_4-alkyl,

A is a straight-chain or branched alkyl radical of 2 to 12 carbon atoms in which one or more —CH_2— groups can be replaced by O atoms,

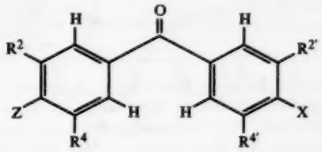
R^5 is H or Ch_3,

$R^{2'}$ and $R^{4'}$ are each H, C_1–C_4-alkyl, —O—C_1'C_4-alkyl or X,

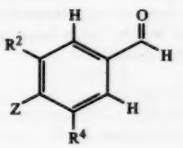
R^2, R^3 and R^4 are each H, $C_1 \propto C_4$-alkyl, —O—C_1–C_4-alkyl, —COOh, —SO_3H, —CF_3, or



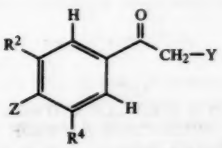
(C) from 0.01 to 10% by weight of a polymerizationregulating, photoreactive compound which, in the excited state, is capable of abstracting hydrogen having the formula:



or

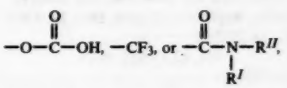


or



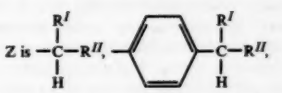
where Y is H or —CH_3,

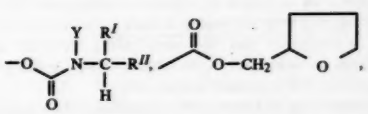
X is H, —O—CH_3, —O—C_2H_5,

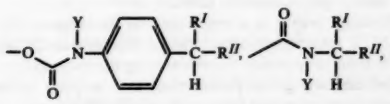


where

R^I and R^{II} may be identical or different and are each H or C_1–C_4-alkyl,







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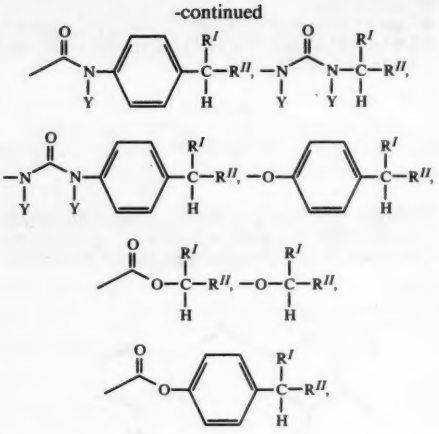


R^2 and R^4 are identical or different and are each CH_3 or X, $R^{2'}$ and $R^{4'}$ are identical or different and are each CH_3 or X is subjected to free radical polymerization and the stated percentages by weight being based on the sum of the weights of (A)+(B)+(C).

5,073,612

HYDROPHILIC POLYMER AND METHOD FOR PRODUCTION THEREOF

Yoshio Irie; Shigeyasu Morihiro, both of Himeji; Teruaki Fujiwara, Nagaokakyo; Masazumi Sasabe, Kakogawa, and Kaoru Iwasaki, Ibo, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo, Co., Ltd., Osaka, Japan

Filed Dec. 27, 1988, Ser. No. 290,518

Claims priority, application Japan, Dec. 28, 1987, 62-329534; Oct. 17, 1988, 63-259542

Int. Cl.[5] C08F *6/26*

U.S. Cl. 526—240 **10 Claims**

1. A method for the production of a hydrophilic polymer having a water absorption capacity thereof 1 to 30 times of its own weight, which method comprises:

i) preparing a monomer component comprising (a) 2 to 25 mol % of a hydroxyl group-containing alpha, beta-ethylenically unsaturated monomer, (b) 5 to 30 mol % of a carboxyl group-containing alpha, beta-ethylenically unsaturated monomer, (c) 93 to 45 mol % of a carboxylate group-containing alpha, beta-ethylenically unsaturated monomer, providing that the total of (b) and (c) is in the range of 98 to 75 mol %, aqueous solution, and d) cross-linking monomer possessing at least 2 unsaturated groups in its molecular unit, the cross-linking monomer being present in an amount in the range of 0.001 to 0.5 mol % based on said monomer component;

ii) polymerizing said monomer component in the presence of a radical polymerization initiator, and

iii) heating treating at a temperature in the range of 150 to 250° C. for a period in the range of 10 minutes to 20 hours, the resultant polymer thereby causing the hydroxyl group and carboxyl group possessed by said polymer to react with each other and form a cross-linked structure.

5,073,613

FLUORINE-CONTAINING COPOLYMER, PROCESS FOR ITS PRODUCTION AND CURABLE COMPOSITION

Ryuichi Miura, Yokohama; Ken Moriwaki, Kawasaki; Hiromitu Takeyasu, Tokyo; Hiroshi Washita, and Nobuyuki Miyazaki, both of Yokohama, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,197

Claims priority, application Japan, May 24, 1988, 63-124908; Mar. 17, 1989, 1-63910

Int. Cl.[5] C08F *14/18*

U.S. Cl. 526—255 **7 Claims**

1. A fluorine-containing copolymer having fluidity at room temperature and comprising, based on entire polymer units, from 20 to 70 mol % of polymer units (1) derived from a polyfluoroolefin and from 1 to 80 mol % of polymer units (2) having a polyoxyalkylene chain having, at its terminal, a group selected from the group consisiting of an active hydrogen-containing group, an epoxy group and a functional group crosslinkable by the action of moisture, the total of the polymer units (1) and the polymer units (2) being from 30 to 100 mol %.

5,073,614

STRONGLY SWELLABLE, MODERATELY CROSSLINKED POLYVINYLPYRROLIDONE

Jenn S. Shih, Paramus; Terry E. Smith, Morristown, and Jui-Chang Chuang, Wayne, all of N.J., assignors to ISP Investments Inc., Wilmington, Del.

Filed Oct. 18, 1990, Ser. No. 599,592

Int. Cl.[5] C08F *26/06*

U.S. Cl. 526—258 **20 Claims**

1. Strongly swellable, moderately crosslinked polyvinylpyrrolidone in the form of fine, white powders having (a) an aqueous gel volume of about 15 to 150 ml/g of polymer, (b) a Brookfield viscosity in 5% aqueous solution of at least about 10,000 cps, and (c) being prepared directly by precipitation polymerization of monomers consisting essentially of vinyl pyrrolidone in an organic solvent in the presence of a crosslinking agent in the amount of about 0.2 to about 1% by weight of vinyl pyrrolidone and a free radical polymerization initiator.

5,073,615

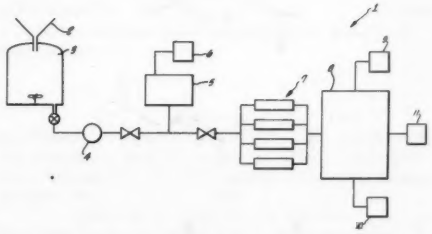
HIGH TEMPERATURE HEAT RESISTANT ACRYLICS

Jyi-Sheng J. Shen, San Dimas, Calif., assignor to Continental Polymers, Inc., Compton, Calif.

Filed Mar. 13, 1989, Ser. No. 322,615

Int. Cl.[5] C08F *222/40*

U.S. Cl. 526—262 **3 Claims**



1. A method of making a bulk methacrylate-maleimide copolymer comprising the steps of:

selecting a first monomer from the group methyl methacrylate, ethyl methacrylate, ethyl acrylate, butyl acrylate and propyl acrylate;

selecting a second monomer from the group maleimide, N-methylmaleimide, N-ethylmaleimide, N-phenylmaleimide and N-cyclohexylmaleimide;

selecting a low temperature initiator having a half life of about ten hours at about 50–70° C.;
selecting a high temperature initiator having a half life of about ten hours at about 90–130° C.;
selecting a chain transfer agent means for controlling chain lengths of copolymers to be formed from said first and second monomer;
thoroughly mixing the first monomer, second monomer, low temperature initiator, high temperature initiator and chain transfer agent means in a container to form a mixture;
purging the mixture with a relatively non-reactive gas to form a purged mixture;
passing the purged mixture through a filter to form a filtered mixture;
placing a predetermined quantity of the filtered mixture into a cell to form a mixture bulk;
placing the mixture bulk into a reaction chamber;
heating the reaction chamber to a first temperature of about 55°–70° C. and maintaining the first temperature for about 5–10 hours;
establishing in the reaction chamber a second temperature of about 40°–55° C. and maintaining the second temperature for about 5–10hours;
establishing in the reaction chamber a third temperature of about 70°–85° C. and maintaining the third temperature for about 5–10 hours;
establishing in the reaction chamber a fourth temperature of about 100°–120° C. and maintaining the fourth temperature for at least 3 hours; and
establishing in the reaction chamber a fifth temperature of about 120°–250° C. and maintaining the fifth temperature for at least 3 hours to form a bulk copolymer.

5,073,616
HIGH WATER CONTENT SOFT CONTACT LENS

Hideyuki Futamura, Kodama; Yuuichi Yokoyama, Kounosu, and Makoto Tsuchiya, Honjo, all of Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Sep. 25, 1989, Ser. No. 412,103
Claims priority, application Japan, Sep. 30, 1988, 63-246381
Int. Cl.[5] C08F *26/10*
U.S. Cl. 526—264 **8 Claims**

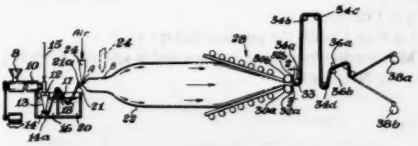
1. A high water content soft contact lens containing 50–70% of water and having high durability to chemical stain removers, a tensile strength of 200 g/mm^2 or more, a tensile modulus of elasticity of 90 g/mm^2 or more and a stress relaxation of 20% or less, which lens consists of a copolymer obtained by copolymerizing a composition comprising 35–60% by weight of N-vinyl-2-pyrrolidone: 9–30% by weight of an N,N-dialkyl(meth)acrylamide; the total of N-vinyl-2-pyrrolidone and the N,N-dialkyl(meth)acrylamide being 44–70% by weight; 20–45% by weight of a hydrocarbon group-containing (meth-)acrylate which may have fluorine substituent(s) and/or siloxane linkage(s); 5–20% by weight of a hydrocarbon group-containing (meth)acrylate which has at least one hydroxyl group and which may further have intervening ether linkage(s); and 0.1–1.5% by weight of a monomer component containing at least two (meth)acrylic groups in the molecule.

5,073,617
BARRIER FILM AND PROCESS FOR MAKING

Edward M. Jorge, Midland, Mich.; Antonio Torres, Simtsonville, S.C., and Monty M. Lund, deceased, late of Midland, Mich. by Lorraine K. Lund, administrator , assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 3, 1989, Ser. No. 292,716
Int. Cl.[5] C08F *14/08, 114/08, 214/08*
U.S. Cl. 526—343 **10 Claims**

1. A film comprising a vinylidene chloride interpolymer, wherein the vinylidene chloride interpolymer having polymerized herein vinylidene chloride in an amount of from about 75 to about 95 percent by weight of interpolymer and from about 25 to about 5 percent by weight of interpolymer of at least one monomer copolymerized therewith, is prepared by extruding said interpolymer through an extrusion die to form an extrudate; passing the extrudate through a cooling means; blowing a blown tubular bubble by expanding the cooled extrudate sheet around a trapped gaseous medium, said bubble having an effective blow-up ratio before deflation such that the bubble after deflation has a desired final blow-up ratio; and conveying the tubular bubble through a deflator means to collapse the bubble



into a two-layer film, wherein the film has a final blow-up ratio of between about 2.5 to about 3.5 said film having an amorphous phase and a crystalline phase with vinylidene chloride crystalline units, said crystalline units and amorphous units being positioned such that the film has a machine direction Elmendorf tear strength of at least 1.5 times the transverse direction percent elongation of at least 1.5 times machine direction percent elongation.

5,073,618
PROCESS FOR THE PRODUCTION OF ORGANOSILICON COMPOUNDS

Stephen Westall, Barry, Wales, assignor to Dow Corning Limited, Barry, Wales

Filed Jan. 31, 1990, Ser. No. 473,075
Claims priority, application United Kingdom, Feb. 9, 1989, 8902936
Int. Cl.[5] C08G *77/06*
U.S. Cl. 528—13 **8 Claims**

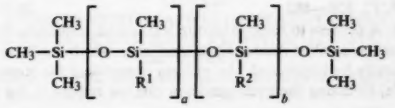
1. A process for the production of an organosilicon condensation product which comprises contacting (A) at least one organosilicon compound having in the molecule at least one silanol group and wherein the organo substituents are selected from the group consisting of monovalent hydrocarbon groups having from 1 to 14 carbon atoms and monovalent substituted hydrocarbon groups having from 1 to 10 carbon atoms, said substituted hydrocarbon groups being non-acidic in character, and (B) a borate or phosphate of sodium or potassium.

5,073,619
SILICONE AMPHOTERIC POLYMERS

Anthony J. O'Lenick, Jr., Lilburn, Ga., assignor to Siltech Inc., Norcross, Ga.

Continuation-in-part of Ser. No. 448,308, Dec. 11, 1989, Pat. No. 4,973,643.
Filed Aug. 9, 1990, Ser. No. 564,785
Int. Cl.[5] C08G *77/04*
U.S. Cl. 528—26 **10 Claims**

1. A silicone amphoteric polymer which conforms to the following structure;

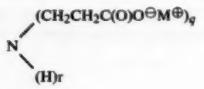


a is an integer from 1 to 200;
b is an integer from 1 to 200;
R^1 is selected from $-(CH_2)_nCH_3$ and phenyl;
n is an integer from 0 to 10;
R^2 is $-(CH_2)_3-(OCH_2CH_2)x-(OCH_2CH(CH_3))y-(OCH_2CH_2)z-R^3$;

x, y and z are integers and are independently selected from 0 to 20;

R^3 is

R^3 is



q is 1 or 2;

r is 0 or 1, with the proviso that q+r=2

M is needed for charge balance and is selected from Na, K, Li, NH_4, or H.

5,073,620

THERMOPLASTIC RESIN COMPOSITION

Takashi Sanada; Kaoru Kitadono; Yasurou Suzuki; Taichi Nishio; Hiroomi Abe, and Noriyasu Kagawa, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 3, 1989, Ser. No. 317,838

Claims priority, application Japan, Mar. 30, 1988, 63-79808

Int. Cl.[5] C08L *51/04, 53/02, 71/12, 77/00*

U.S. Cl. 525—68 **18 Claims**

1. A thermoplastic resin composition which comprises:

(A) 10–70 parts by weight of a polyphenylene ether, a mixture of a polyphenylene ether and a polystyrene or a polyphenylene ether-styrene graft copolymer,

(B) 90–30 parts by weight of a mixture of (i) at least one copolyamide selected from the group consisting of a thermoplastic aromatic copolyamide and an aromatic nuclear-hydrogenated copolyamide in an amount of 0.1–70% by weight of existing total polyamide and (ii) a thermoplastic aliphatic polyamide in a complementary amount of 99.9–30% by weight of existing total polyamide, and

(C) 0.01–30 parts by weight, based on 100 parts by weight of the above components (A) and (B), of at least one compound selected from the group consisting of oxazoline and a compound having, in its molecule, (a) carbon-carbon double bond or a carbon-carbon triple bond and (b) at least one functional group selected from carboxyl group, acid anhydride group, amino group, acid amide group, imido group, epoxy group, carboxylate ester group, isocyanate group, methylol group, oxazolidine group and hydroxyl group.

5,073,621

REMOVAL OF GROUP VIII METAL CATALYST FROM POLYMER CEMENTS BY EXTRACTION WITH AQUEOUS DICARBOXYLIC ACID

Raymond C. Tsiang, Sugarland, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 16, 1990, Ser. No. 515,999

Int. Cl.[5] C08F *6/08*

U.S. Cl. 528—483 **24 Claims**

1. A process to remove Group VIII metal containing hydrogenation catalyst residue from a polymer which has been catalytically hydrogenated, the process comprising the steps of:

(a) oxidizing the hydrogenation catalyst residue in the polymer;

(b) contacting the polymer with an aqueous solution of a dicarboxylic acid;

(c) allowing a hydrogenation catalyst residue precipitate to form; and

(d) separating the hydrogenation catalyst residue from the polymer.

5,073,622

PROCESS FOR THE PREPARATION OF NOVOLAK RESINS WITH LOW METAL ION CONTENT

Bernhard Wojtech, Bad Soden am Taunus; Walter Niederstaetter, Eltville, and Horst-Dieter Thamm, Eschborn, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 10, 1990, Ser. No. 550,692

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1989, 3923426

Int. Cl.[5] C08F *6/00;* **C08G** *3/00*

U.S. Cl. 528—486 **25 Claims**

1. A process for the preparation of novolak resins having a reduced amount of metal ions, comprising the steps of:

(a) dissolving a conventional novolak resin in an organic solvent or solvent mixture in a concentration of about 25 to 50 percent by weight and then

(b) contacting the resultant solution at least once with an acidic compound.

5,073,623

CONDENSATION PRODUCTS BASED ON ROSIN

Bernhard Prantl, Worms; Rolf Walz, Rutesheim, and Erwin Stark, Bad Boll, all of Fed. Rep. of Germany, assignors to BASF Lacke+Farben Aktiengesellschaft, Muenster, Fed. Rep. of Germany

Filed Sep. 6, 1989, Ser. No. 403,313

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1988, 3831242

Int. Cl.[5] D06P *1/46*

U.S. Cl. 530—210 **3 Claims**

1. A condensation product based on rosin, obtainable by

A)	reaction of	
	100 parts by weight of	rosin (component I)
	10–150 parts by weight of	an aromatic mono- or dihydroxy compound substituted by C_1-C_{12}-alkyl in the p-position (component II) and
	3–50 parts by weight of	formaldehyde or a formaldehyde donor compound (component III)

at 50°–250° C. in the presence of a base, although it is also possible first to prepare from components II and III a precondensate (resol) of an average degree of condensation of from 2 to 20, which is then reacted with component I,

B)	further reaction of the stage A condensation product (A) at 150–250° C. with	
	4–40 parts by weight of	an α,β-unsaturated C_3- or C_4-mono- or dicarboxylic acid or with maleic anhydride (component IV) and
C_1)	reaction of the stage B adduct (B) at 100–200° C. with	
	3–100 parts by weight of	a monounsaturated or polyunsaturated aliphatic monohydric or dihydric alcohol or amine or a monounsaturated or polyunsaturated C_2–C_{12}-aminoalcohol (component V) or
C_2)	reaction of (B) with	
	2–30 parts by weight of	a C_2–C_4-alkylene oxide or of a C_2–C_{12}-alkanediol or C_2–C_{12}-aminoalcohol (component VI) at 100–200° C. and then with
	10–100 parts by weight of	a monounsaturated or

-continued

	polyunsaturated C_8–C_{40} fatty acid (component VII) at 150–250° C.,

with the proviso that the molar amount of component (VII) is 0.2–1 mole per mole of (VI),
or obtainable by

D) reaction of 100 parts by weight of 5–40 parts by weight of at 150–250° C.,	rosin (I) with component (IV)
E) reaction of the stage D adduct (D) at 100–200° C. with 2–30 parts by weight of	a C_2–C_{12}-aminoalcohol (VIa),
F) further reaction of the stage E product (E) at 50–250° C. with 10–150 parts by weight of 3–50 parts by weight of in the presence of a base or with 10–200 parts by weight of	component II and component III a component II/component III resol of an average degree of condensation of from 2 to 20 and
G) reaction of the stage F condensation product (F) at 150–250° C. with 10–100 parts by weight of	component VII in the molar ratios of (VII):(VI) mentioned under (C_2).

5,073,624

THERAPEUTIC DECAPEPTIDES

David H. Coy, New Orleans, La., and Jacques-Pierre Moreau, Upton, Mass., assignors to Administrators of the Tulane Educational Fund, New Orleans, La.

Continuation-in-part of Ser. No. 65,765, Jun. 23, 1987, Pat. No. 4,866,160, which is a continuation-in-part of Ser. No. 879,338, Jun. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 798,239, Nov. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 721,330, Apr. 9, 1985, abandoned. This application May 15, 1989, Ser. No. 352,140

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.[5] **C07C** *103/52;* **A61K** *37/02*

U.S. Cl. 530—313 **17 Claims**

1. A decapeptide of the formula: N-Ac-A^1-A^2-A^3-Ser-A^4-A^5- A^6-A^7-A^8-A^9, wherein each A^1, A^2, and A^3, independently, is D-β-Nal, D p-X Phe (where X is halogen, H, NH_2, NO_2, OH, or C_{1-3} alkyl), D benzothienyl (2) Ala, or D-benzothienyl (1)-Ala; A^4 is p X Phe (where X is halogen, H, NH_2, NO_2, or C_{1-3} alkyl), Tyr, Lys, Arg, Leu, Trp, or Nal; A^5 is D Lys, D Tyr, D Arg, D-Phe, β-Nal, D-β-Nal, D-Trp, D-homo-Arg, D-diethyl-homo Arg, D-p-X-Phe (where X is halogen, H, NH_2, NO_2, or Cl_{1-3} alkyl) or D-Lys-ϵ-NH-R (where R is H, a branched or straight chain C_1C_{10} alkyl group, or an aryl group); A_6 is Leu, β-Nal, p-X-Phe (where X is halogen, H, NH_2NO_2, OH, C_2F_5, or C_{1-3} alkyl), or Trp; A^7 is Arg, Lys, or Lys-ϵ-NH-R (where R is H, a branched or straight chain C_1-C_{10} alkyl group, or an aryl group); A_8 is Pro; and A^9 is D-Ala, D-Ala-NH_2, Ala-NH_2, aminoisobutyric acid amide, or Gly NH_2, provided that at least one of A^2 or A^3 must be D-Phe or D-Tyr, and provided further that when A^4 is Lys or Arg, A^5 must not be D-Lys, D-Arg, D-homo-Arg, D-diethyl-homo-Arg, or D-Lys-ϵ-NH-R, or a pharmaceutically acceptable salt thereof.

5,073,625

SELF-REGULATING POROUS HEATING DEVICE

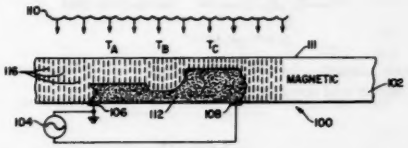
Rodney L. Derbyshire, Menlo Park, Calif., assignor to Metcal, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 917,266, Oct. 8, 1986, Pat. No. 4,794,226, which is a continuation of Ser. No. 498,328, May 26, 1983, abandoned. This application Aug. 18, 1988, Ser. No. 233,375

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.[5] **B01J** *19/08;* **B01D** *37/00;* **F24H** *1/00*

U.S. Cl. 530—333 **8 Claims**



1. In a chemical process for
providing a moving fluid that will undergo a chemical reaction at a given temperature and wherein one portion of said fluid has a temperature different from the temperature of another portion,
wherein the entire body of said fluid is heated to a substantially uniform temperature that is substantially equal to said given temperature, the improvement comprising:
(a) providing a heating element for said fluid that includes an elongated ferromagnetic electrical conductor having a Curie temperature at about said given temperature and whose magnetic permeability decreases as said conductor approaches said Curie temperature,
(b) causing an alternating electrical current to flow along a path in said conductor in the direction of elongation of said conductor,
(c) providing said element with pores extending in a direction transverse to said path,
(d) passing said fluid through said pores wherein said alternating electrical current is selected such that one part of said conductor which is contacted by said one portion of said fluid exhibits a magnetic permeability and skin depth of said current which is different from the magnetic permeability and skin depth of current exhibited by another part of said conductor which is contacted by said another portion of said fluid, such that the heat produced by said element at said one part is different from the heat produced at said another part whereby said fluid is heated to said given temperature.

5,073,626

AFFINITY PURIFICATION OF PLASMINOGEN ACTIVATOR INHIBITOR I USING A MODIFIED UROKINASE

Tze-Chein Wun, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

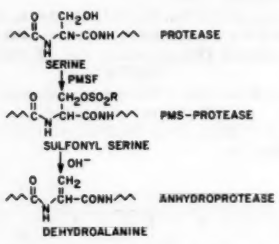
Continuation-in-part of Ser. No. 268,916, Nov. 9, 1988, abandoned. This application Jun. 4, 1990, Ser. No. 532,410

Int. Cl.[5] **C07K** *3/18, 15/06*

U.S. Cl. 530—350 **12 Claims**

1. A method of purifying PAI-1 from a biological fluid containing PAI-1 comprising contacting said biological fluid with a modified urokinase affinity adsorbent and then eluting

PAI-1 from said affinity adsorbent with an acidified arginine solution, wherein said modified urokinase is selected from the



group consisting of anhydrourokinase and urokinase mutated at amino acid position 356 from Ser to Gly.

5,073,627

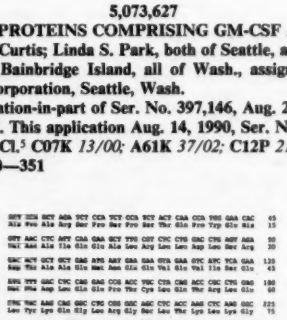
FUSION PROTEINS COMPRISING GM-CSF AND IL-3

Benson M. Curtis; Linda S. Park, both of Seattle, and David J. Cosman, Bainbridge Island, all of Wash., assignors to Immunex Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 397,146, Aug. 22, 1989, abandoned. This application Aug. 14, 1990, Ser. No. 567,983

Int. Cl.[5] C07K *13/00;* **A61K** *37/02;* **C12P** *21/02*

U.S. Cl. 530—351 **8 Claims**



1. A fusion protein having a formula selected from the group consisting of

$$R_1—R_2,R_2—R_1,R_1—L—R_2 \text{ and } R_2—L—R_1$$

wherein R_1 is GM-CSF; R_2 is IL-3; and L is a linker peptide sequence.

5,073,628

HYPOSENSITIZATION AGENT

Tyoku Matsuhashi, Saitama; Mitsuko Usui, Okayama; Masakazu Mitsuhashi, Okayama, and Shunsaku Ando, Okayama, all of Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed Aug. 29, 1990, Ser. No. 574,713

Claims priority, application Japan, Sep. 2, 1989, 1-228085

Int. Cl.[5] A61K *39/36*

U.S. Cl. 530—379 **27 Claims**

1. A conjugate, which comprises a saccharide covalently attached to a cedar pollen allergen having a partial amino acid sequence of Ala-Ile-Asn-Ile-Phe-Asn- beginning at its N-terminus.

5,073,629

METHADONE FLUORESCENCE POLARIZATION IMMUNOASSAY

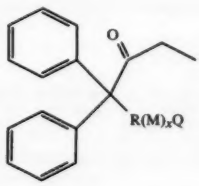
Robert E. Dubler, Gurnee; Susan A. Thacker, Naperville; John A. Walling, Round Lake Beach, and Nai-Yi Wang, Mundelein, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jan. 23, 1989, Ser. No. 300,670

Int. Cl.[5] C07K *17/02, 15/14;* **G01N** *33/536*

U.S. Cl. 530—405 **6 Claims**

1. An immunogen useful in eliciting antibodies for determining the presence or amount of methadone in a test sample, comprising the structure:



wherein

R is a member of the group consisting of $—CH_2CH_2—$, $—CH=CH—CH_2—$, and $—CH_2CH=N—O—CH_2—$;

x is 0 or 1;

M is C=O; and

Q is an immunogenic carrier.

5,073,630

POLYMERIC ANHYDRIDE OF MAGNESIUM AND PROTEIC AMMONIUM PHOSPHOLINOLEATE WITH ANTIVIRAL, ANTINEOPLASTIC AND IMMUNOSTIMULANT PROPERTIES

Odilon D. Nunes, Birigui, and Nelson E. C. Durán, Campinas, both of Brazil, assignors to Nunes & Duran Pesquisa Comercio e Desenvolvimento Ltda., Sao Paulo, Brazil

Filed May 23, 1990, Ser. No. 527,581

Claims priority, application Brazil, May 30, 1989, PI8902936

Int. Cl.[5] C07K *15/22*

U.S. Cl. 530—400 **2 Claims**

1. A polymeric anhydride of magnesium and proteic ammonium phospholinoleate with antiviral, antineoplastic and immunostimulant properties comprising: a content of Mg of 20.1±0.9%, NH_4 of 10.0±3.3%, phosphate of 45.2±2.7%, protein of 0.49%, linoleic acid of 11.6±2.83% and the following amino acids: ASP of 7.19%, THR of 3.56%, SER of 7.56%, GLU of 8.53%, PRO of 0.5%, GLY of 9.69%, ALA of 7.46%, VAL of 1.0%, MET of 4.38%, ISOLEU of 2.54%, LEU of 3.03%, TYR of 0.5%, PHE of 1.0%, HIS of 2.83%, LYS of 3.56%, TRP of 1.3% and ARG of 35.2%.

5,073,631

REACTIVE DISAZO DYES WHICH CONTAIN TWO AMINOFLUORO-1,3,5-TRIAZINYL RADICALS

Peter Scheibli, Bottmingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

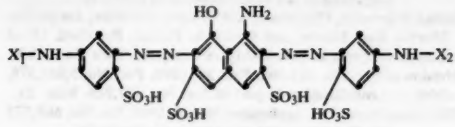
Continuation of Ser. No. 12,326, Feb. 9, 1987, abandoned, which is a continuation of Ser. No. 867,588, May 27, 1986, abandoned, which is a continuation of Ser. No. 583,423, Feb. 24, 1984, abandoned. This application Sep. 14, 1988, Ser. No. 246,031

Claims priority, application Switzerland, Feb. 24, 1983, 1032/83

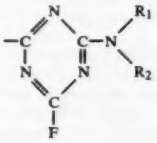
Int. Cl.[5] C09B *62/09;* **D06P** *1/382*

U.S. Cl. 534—634 **2 Claims**

1. A reactive dye of the formula



wherein X_1 and X_2, independently of each other, are each a radical of the formula



wherein $-N(R_1)R_2$ is phenylamino which is unsubstituted in the phenyl nucleus or is substituted therein by halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy or sulfo.

5,073,632

CRYIIB CRYSTAL PROTEIN GENE FROM *BACILLUS THURINGIENSIS*

William P. Donovan, Levittown, Pa., assignor to Ecogen Inc., Langhorne, Pa.

Continuation-in-part of Ser. No. 39,542, Apr. 16, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 379,015

Int. Cl.[5] **C12N** *15/32;* **C07H** *21/04*

U.S. Cl. 536—27 **2 Claims**

1. A purified and isolated CryIIB gene having a nucleotide sequence coding for the following amino acid sequence:

Met	Asn	Ser	Val	Leu	Asn	Ser	Gly	Arg	Thr
Thr	Ile	Cys	Asp	Ala	Tyr	Asn	Val	Ala	Ala
His	Asp	Pro	Phe	Ser	Phe	Gln	His	Lys	Ser
Leu	Asp	Thr	Val	Gln	Lys	Glu	Trp	Thr	Glu
Trp	Lys	Lys	Asn	Asn	His	Ser	Leu	Tyr	Leu
Asp	Pro	Ile	Val	Gly	Thr	Val	Ala	Ser	Phe
Leu	Leu	Lys	Lys	Val	Gly	Ser	Leu	Val	Gly
Lys	Arg	Ile	Leu	Ser	Glu	Leu	Arg	Asn	Leu
Ile	Phe	Pro	Ser	Gly	Ser	Thr	Asn	Leu	Met
Gln	Asp	Ile	Leu	Arg	Glu	Thr	Glu	Lys	Phe
Leu	Asn	Gln	Arg	Leu	Asn	Thr	Asp	Thr	Leu
Ala	Arg	Val	Asn	Ala	Glu	Leu	Thr	Gly	Leu
Gln	Ala	Asn	Val	Glu	Glu	Phe	Asn	Arg	Gln

10 20 30 40 50 60 70 80 90 100 110 120 130 140

-continued

Val	Asp	Asn	Phe	Leu	Asn	Pro	Asn	Arg	Asn
Ala	Val	Pro	Leu	Ser	Ile	Thr	Ser	Ser	Val
Asn	Thr	Met	Gln	Gln	Leu	Phe	Leu	Asn	Arg
Leu	Pro	Gln	Phe	Gln	Met	Gln	Gly	Tyr	Gln
Leu	Leu	Leu	Leu	Pro	Leu	Phe	Ala	Gln	Ala
Ala	Asn	Leu	His	Leu	Ser	Phe	Ile	Arg	Asp
Val	Ile	Leu	Asn	Ala	Asp	Glu	Trp	Gly	Ile
Ser	Ala	Ala	Thr	Leu	Arg	Thr	Tyr	Arg	Asp
Tyr	Leu	Lys	Asn	Tyr	Thr	Arg	Asp	Tyr	Ser
Asn	Tyr	Cys	Ile	Asn	Thr	Tyr	Gln	Ser	Ala
Phe	Lys	Gly	Leu	Asn	Thr	Arg	Leu	His	Asp
Met	Leu	Glu	Phe	Arg	Thr	Tyr	Met	Phe	Leu
Asn	Val	Phe	Glu	Tyr	Val	Ser	Ile	Trp	Ser
Leu	Phe	Lys	Tyr	Gln	Ser	Leu	Leu	Val	Ser
Ser	Gly	Ala	Asn	Leu	Tyr	Ala	Ser	Gly	Ser
Gly	Pro	Gln	Gln	Thr	Gln	Ser	Phe	Thr	Ser
Gln	Asp	Trp	Pro	Phe	Leu	Tyr	Ser	Leu	Phe
Gln	Val	Asn	Ser	Asn	Tyr	Val	Leu	Asn	Gly
Phe	Ser	Gly	Ala	Arg	Leu	Ser	Asn	Thr	Phe
Pro	Asn	Ile	Val	Gly	Leu	Pro	Gly	Ser	Thr
Thr	Thr	His	Ala	Leu	Leu	Ala	Ala	Arg	Val
Asn	Tyr	Ser	Gly	Gly	Ile	Ser	Ser	Gly	Asp
Ile	Gly	Ala	Ser	Pro	Phe	Asn	Gln	Asn	Phe
Asn	Cys	Ser	Thr	Phe	Leu	Pro	Pro	Leu	Leu
Thr	Pro	Phe	Val	Arg	Ser	Trp	Leu	Asp	Ser
Gly	Ser	Asp	Arg	Glu	Gly	Val	Ala	Thr	Val
Thr	Asn	Trp	Gln	Thr	Glu	Ser	Phe	Glu	Thr

150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410

-continued

Thr	Leu	Gly	Leu	Arg	Ser	Gly	Ala	Phe	Thr
									420
Ala	Arg	Gly	Asn	Ser	Asn	Tyr	Phe	Pro	Asp
									430
Tyr	Phe	Ile	Arg	Asn	Ile	Ser	Gly	Val	Pro
									440
Leu	Val	Val	Arg	Asn	Glu	Asp	Leu	Arg	Arg
									450
Pro	Leu	His	Tyr	Asn	Glu	Ile	Arg	Asn	Ile
									460
Ala	Ser	Pro	Ser	Gly	Thr	Pro	Gly	Gly	Ala
									470
Arg	Ala	Tyr	Met	Val	Ser	Val	His	Asn	Arg
									480
Lys	Asn	Asn	Ile	His	Ala	Val	His	Glu	Asn
									490
Gly	Ser	Met	Ile	His	Leu	Ala	Pro	Asn	Asp
									500
Tyr	Thr	Gly	Phe	Thr	Ile	Ser	Pro	Ile	His
									510
Ala	Thr	Gln	Val	Asn	Asn	Gln	Thr	Arg	Thr
									520
Phe	Ile	Ser	Glu	Lys	Phe	Gly	Asn	Gln	Gly
									530
Asp	Ser	Leu	Arg	Phe	Glu	Gln	Asn	Asn	Thr
									540
Thr	Ala	Arg	Tyr	Thr	Leu	Arg	Gly	Asn	Gly
									550
Asn	Ser	Tyr	Asn	Leu	Try	Leu	Arg	Val	Ser
									560
Ser	Ile	Gly	Asn	Ser	Thr	Ile	Arg	Val	Thr
									570
Ile	Asn	Gly	Arg	Val	Tyr	Thr	Ala	Thr	Asn
									580
Val	Asn	Thr	Thr	Thr	Asn	Asn	Asp	Gly	Val
									590
Asn	Asp	Asn	Gly	Ala	Arg	Phe	Ser	Asp	Ile
									600
Asn	Ile	Gly	Asn	Val	Val	Ala	Ser	Ser	Asn
									610
Ser	Asp	Val	Pro	Leu	Asp	Ile	Asn	Val	Thr
									620
Leu	Asn	Ser	Gly	Thr	Gln	Phe	Asp	Leu	Met
									630
Asn	Ile	Met	Leu	Val	Pro	Thr	Asn	Ile	Ser
Pro	Leu	Tyr	End						

5,073,633

BMY-41950 ANTITUMOR ANTIBIOTIC

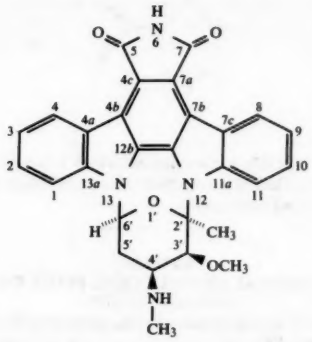
Daniel Schroeder, Higganum; Kin S. Lam, Cheshire; Jacqueline Mattei, East Haven, and Grace A. Hesler, Branford, all of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 482,364, Feb. 20, 1990, Pat. No. 5,015,578, which is a continuation-in-part of Ser. No. 327,929, Mar. 23, 1989, abandoned. This application Nov. 5, 1990, Ser. No. 608,773

Int. Cl.[5] **C07D** *273/00;* **C07H** *17/00, 19/00*

U.S. Cl. 540—545 **1 Claim**

1. A compound designated BMY-41950 having the formula



5,073,634

TETRACHLOROFERRATES OF BASIC DYES

Johannes P. Dix, Weisenheim; Guenter Hansen, Ludwigshafen, and Hellmut Kast, Bobenheim-Roxheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 1, 1990, Ser. No. 517,839

Claims priority, application Fed. Rep. of Germany, May 26, 1989, 3917257

Int. Cl.[5] **C09B** *19/00, 69/02;* **D06P** *1/41*

U.S. Cl. 544—103 **1 Claim**

1. A basic dye of formula I:

$$CHR^{+}[FeCl_4]^{-}$$

where Chr^{+} is a cation of an oxazine dye.

5,073,635

PROCESS OF PREPARING LINEARLY-EXTENDED POLYALKYLENEPOLYAMINES EMPLOYING METAL SILICATE CATALYSTS

Robert G. Bowman; David C. Molzahn, and George E. Hartwell, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 22, 1990, Ser. No. 542,489

Int. Cl.[5] **C07D** *295/00;* **C07C** *209/00*

U.S. Cl. 544—401 **34 Claims**

1. A process of preparing linearly-extended polyalkylenepolyamines comprising contacting a difunctional aliphatic alcohol, characterized as having (a) at least one hydroxyl moiety bound to a primary carbon atom, and (b) at least one additional moiety selected from the group consisting of hydroxyl, primary amine and secondary amine functionalities, with ammonia or any primary or secondary aliphatic amine which is capable of animating the difunctional alcohol, the contacting occurring in the presence of a catalytic amount of a metal silicate wherein the metal is selected from the group consisting of Groups IIIB, IVB, VB and the lanthanide metals with the proviso that the Group IVB metal silicate is essentially free of phosphorus, the contacting occurring under reac-

tion conditions such that a mixture of polyalkylenepolyamines enriched in linearly-extended products is produced.

5,073,636

PREPARATION OF SYMMETRICAL TETRACHLOROPYRIDINE FROM CHLORINATED BETA-(TRICHLOROMETHYL)PYRIDINES EMPLOYING A CATALYST

Paula L. Humphreys, San Ramon, and Thomas J. Dietsche, Berkeley, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 253,809, Oct. 5, 1988, Pat. No. 4,968,807, which is a continuation of Ser. No. 7,873, Jan. 28, 1987, abandoned, which is a continuation of Ser. No. 648,109, Sep. 7, 1984, Pat. No. 4,681,945, which is a continuation-in-part of Ser. No. 431,515, Sep. 30, 1982, abandoned. This application Jun. 5, 1990, Ser. No. 533,983

The portion of the term of this patent subsequent to Jul. 21, 2004, has been disclaimed.

Int. Cl.[5] C07D *213/61*

U.S. Cl. 546—345 **11 Claims**

1. A method of preparing 2,3,5,6-tetrachloropyridine which comprises contacting a chlorinated β-(trichloromethyl)pyridine, or a mixture of chlorinated β-(trichloromethyl)pyridines, with chlorine in a liquid phase reaction in the presence of an effective amount of ferric chloride catalyst under conditions sufficient to form 2,3,5,6-tetrachloropyridine in high yield.

5,073,637

PREPARATION OF 2,3-DIFLUORO-5-(TRIFLUOROMETHYL)PYRIDINE

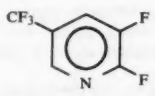
John C. Little, Lafayette, and Charles A. Wilson, Pittsburg, both of Calif., assignors to The Dow Chemical, Midland, Mich.

Division of Ser. No. 300,100, Jan. 23, 1989, Pat. No. 4,973,698, which is a continuation of Ser. No. 125,436, Nov. 25, 1987, abandoned, which is a continuation-in-part of Ser. No. 901,714, Aug. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 665,588, Oct. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 564,800, Dec. 23, 1983, abandoned. This application Jul. 3, 1990, Ser. No. 548,163

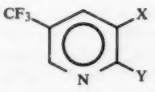
Int. Cl.[5] B01D *3/00*; C07D *213/26*

U.S. Cl. 546—345 **9 Claims**

1. A process for making a product compound of the formula



which comprises contacting, in a liquid medium, at an effective temperature of 50° C. to the boiling point of the liquid medium, and at a pressure of from 10 mmHg to 10 atmospheres, a reactant compound having the formula



wherein X is Cl or Br and Y is Cl, Br, F, or I with an effective amount of KF, while removing the product compound by distillation essentially as it is formed.

5,073,638

PROCESS FOR THE PRODUCTION OF 2-THIOCYANOMETHYLTHIOBENZOTHIAZOLE

Lawrence S. Conaway, Dundee, Miss.; Marc F. Nagel, Memphis, and John D. Pera, Cordova, both of Tenn., assignors to Buckman Laboratores International, Inc., Memphis, Tenn.

Continuation of Ser. No. 268,476, Nov. 4, 1988, abandoned. This application Sep. 26, 1990, Ser. No. 587,655

Int. Cl.[5] C07D *277/74*

U.S. Cl. 548—169 **14 Claims**

1. A process for preparing 2-thiocyanomethylthiobenzothiazole consisting essentially of the steps of

(a) reacting 2-chloromethylthiobenzothiazole with either alkali metal or ammonium thiocyanate in the presence of at least one glycol ether as a solvent for the thiocyanate, wherein the glycol ether is selected from the group consisting of the monomethyl, monoethyl, monopropyl, monobutyl and monophenyl ethers of ethylene glycol and diethylene glycol; the monomethyl, monoethyl, monopropyl, monobutyl, and monophenyl ethers of propylene glycol, dipropylene glycol, and tripropylene glycol; and the dimethyl, diethyl, dipropyl and dibutyl ethers of ethylene glycol, diethylene glycol, propylene glycol, dipropylene glycol, and tripropylene glycol, at a temperature and for a time sufficient to produce said 2-thiocyanomethylthiobenzothiazole in solution in the glycol ether and to produce at least one insoluble reaction by-product; and

(b) separating said 2-thiocyanomethylthiobenzothiazole-glycol ether solution from said by-product to obtain a solution of 2-thiocyanomethylthiobenzothiazole in glycol ether.

5,073,639

PROCESS FOR THE SYNTHESIS OF NOVEL AND KNOWN NITROIMIDAZOLES WHICH ARE USEFUL AS SENSITIZING AGENTS

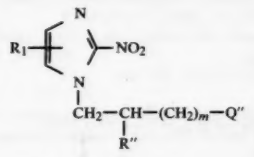
Mark J. Suto, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 274,209, Nov. 25, 1988, Pat. No. 4,954,515. This application Jun. 4, 1990, Ser. No. 532,428

Int. Cl.[5] C07D *277/18*

U.S. Cl. 548—339 **6 Claims**

1. A process for the preparation of a compound of the formula (I″)



I″

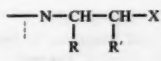
or a pharmaceutically acceptable salt thereof;

wherein m is 0 or 1 when R″ is hydrogen and m is 1 when R″ is OR_3;

R_1 is hydrogen or lower alkyl;

R″ is (1) hydrogen or (2) OR_3 wherein R_3 is H and

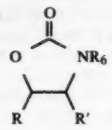
Q″ is



(2)

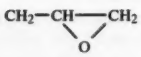
wherein X is chloro or bromo wherein R and R′ are independently hydrogen, lower alkyl, aryl is as defined above, or aralkyl is as defined above;

which consists essentially of (1) treating a compound of the formula (II″)

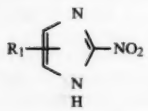


II″

wherein R and R′ are as defined above; and R_6 is

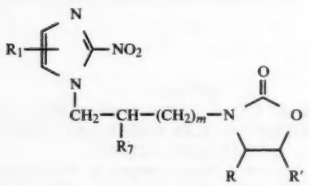


or $(CH_2)_nC_2Cl$ wherein n is 1 or 2;
with a compound of the formula (III)



III

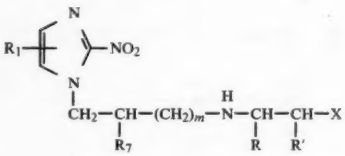
wherein R_1 is as defined above;
in the presence of K_2CO_3 or Cs_2CO_3 in a solvent to obtain a compound of the formula (IV)



IV

wherein m, R_1, R, and R′ are as defined above; and R_7 is hydrogen when R_6 is $(CH_2)_nCH_2Cl$, or R_7 is OH when R_6 is $CH_2—CH—CH_2$

(2) treating the compound of formula IV with a compound of the formula HX wherein X is halogen to obtain a compound of formula (I_1)



I_1

wherein m, R_1, R, R′, R_7, and X are as defined above.

5,073,640

CYCLICDIHYDROXY COMPOUNDS

Stephen C. Taylor, Darlington, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

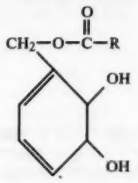
Filed Oct. 12, 1989, Ser. No. 420,367

Claims priority, application United Kingdom, Oct. 13, 1988, 8823977

Int. Cl.[5] C07C *69/25, 69/18, 69/30;* **C12P** *7/62*

U.S. Cl. 560—254 **3 Claims**

1. A compound having the formula:



wherein R is selected from the class consisting of alkyl groups.

5,073,641

PRODRUG DERIVATIVES OF CARBOXYLIC ACID DRUGS

Hans Bundgaard, Tjørnevej 36, DK-2970 Horsholm, and Niels M. Nielsen, Cumberlandsgade 15, st.th., DK-2300 Copenhagen, both of Denmark

PCT No. PCT/DK87/00104, § 371 Date Apr. 26, 1988, § 102(e) Date Apr. 26, 1988, PCT Pub. No. WO88/01615, PCT Pub. Date Mar. 10, 1988

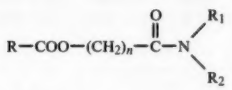
PCT Filed Aug. 25, 1987, Ser. No. 188,407

Claims priority, application Denmark, Aug. 26, 1986, 4066/86

Int. Cl.[5] C07C *69/76*

U.S. Cl. 560—56 **8 Claims**

1. Compounds of the formula I



I

wherein R—COO— represents the acyloxy residue of a carboxylic acid drug or medicament selected from:

Indomethacin
Naproxen
Ibuprofen
Flurbiprofen
5-Aminosalicylic Acid
L-Dopa
Furosemide and
N-Acetylcysteine

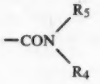
and R_1 and R_2 are the same or different and are selected from a group consisting of an alkyl group, an alkenyl group, an aryl group, an aralkyl group, a cycloalkyl group, in which the alkyl, alkenyl, aryl, aralkyl or cycloalkyl group is unsubstituted or substituted with one or more substituents selected from:

a halogen atom,

a hydroxy group,

a straight or branched-chain alkoxy group having the formula $R_3—O—$, wherein R_3 represents an alkyl group or an aryl group, which groups may be unsubstituted or substituted with one or more of a halogen atom or a hydroxy group,

a carbamoyl group having the formula



wherein R_4 and R_5 are the same or different and are hydrogen, an alkyl group or are selected from a group having the formula $—CH_2NR_7R_6$, wherein R_6 and R_7 are the same or different and are hydrogen, or an alkyl group,

an amino group having the formula $—NR_8R_9$, wherein R_8 and R_9 are the same or different and are hydrogen, or an alkyl group

an acyloxy group having the formula $—COOR_{10}$, wherein R_{10} is an alkyl, aryl or aralkyl group,

an oxyacyl group having the formula $R_{11}COO$— wherein R_{11} is hydrogen, an alkyl group, an aryl group, an aralkyl group, a cycloalkyl group, in which the alkyl, aryl, aralkyl or cycloalkyl group is unsubstituted or substituted with one or more of a halogen atom, a hydroxy group, an alkoxy group of the formula R_3—O— as defined above, a carbamoyl group of the formula —$CONR_4R_5$ as defined above or an amino group having the formula —NR_8R_9 as defined above;

and nontoxic pharmaceutically acceptable acid addition salts thereof.

5,073,642

TRISUBSTITUTED BENZOIC ACID INTERMEDIATES

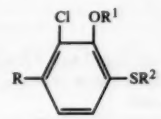
William J. Michaely, El Cerrito, and Jeff K. Curtis, Berkeley, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 386,648, Jul. 31, 1989, Pat. No. 5,001,256, which is a division of Ser. No. 273,391, Nov. 18, 1988, abandoned. This application Dec. 10, 1990, Ser. No. 624,933

Int. Cl.[5] C07C *323/20, 255/50*

U.S. Cl. 560—18 **2 Claims**

1. A compound having the structure formula



wherein R is carboxy, cyano or —CO_2R_a wherein R_a is C_1–C_4 alkyl; R^1 is C_1–C_4 alkyl, C_1–C_4 haloalkyl, —$CH_2CH_2OCH_3$, —$CH_2CH_2OC_2H_5$, —$CH_2CH_2SCH_3$ or —$CH_2CH_2SC_2H_5$ and R^2 is C_1–C_4 alkyl with the proviso that when R is carboxy, then R^1 is only —$CH_2CH_2OCH_3$, —$CH_2CH_2OC_2H_5$, —$CH_2CH_2SCH_3$ or —$CH_2CH_2SC_2H_5$.

5,073,643

HIGH YIELD SYNTHESIS OF HYDROXYL-CONTAINING CATIONIC PHOTOINITIATORS

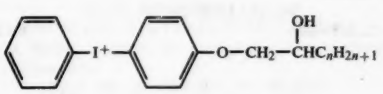
James V. Crivello, Clifton Park, N.Y., assignor to Polyset Corporation, Round Lake, N.Y.

Filed Aug. 30, 1990, Ser. No. 575,276

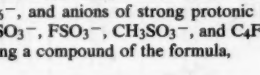
Int. Cl.[5] C07F *5/02, 9/90, 9/92, 9/00*

U.S. Cl. 556—64 **6 Claims**

1. A method for quantitative synthesis of broadly soluble diaryliodonium photo- and thermo-active polymerization initiator salts of the formula,



in which the values of n are integers from 0 to 25 and X^- includes complex metal halide anions such as BF_4^-, PF_6^-, AsF_6^-, SbF_6^-, and anions of strong protonic acids such as ClO_4^-, $CF_3SO_3^-$, FSO_3^-, $CH_3SO_3^-$, and $C_4F_9SO_3^-$, comprising reacting a compound of the formula,



with [hydroxy(tosyloxy)]iodobenzene in the presence an organic solvent and a reagent providing an anion of a complex metal halide or a strong protonic acid, as aforesaid.

5,073,644

METHOD OF PREPARING PURE 3-BUTENYL TRIORGANOOXYSILANES, THE INTERMEDIATE PRODUCTS 3,4-DICHLOROBUTYL TRIORGANO-OXYSILANES AND USE OF THE FINAL PRODUCTS

Ulrich Deschler, Birkenweg 1; Peter Kleinschmit, Wildaustrasse 19, both of D-6450 Hanau 9; Siegfried Wolff, Weiherstrasse 28, D-5303 Bornheim-Merten, and Ewe-Hong Tan, Rembrandtstrasse 22, D-5047 Wesserling, all of Fed. Rep. of Germany

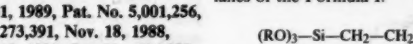
Filed Jul. 6, 1989, Ser. No. 375,923

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1988, 3823450

Int. Cl.[5] C07F *7/18*

U.S. Cl. 556—482 **4 Claims**

1. A method of preparing pure 3-butenyl triorgano oxysilanes of the Formula I:



(I)

in which

R represents a member of the group consisting of C_1–C_8 -alkyl, aryl and aralkyl said method comprising:

a) hydrosilylating 3,4-dichlorobutene-l with trichlorosilane and distilling off the 3,4 dichlorobutyl trichlorosilane thereby produced,

b) Esterifying the compound produced in step a) with an alcohol of the general formula ROH (II) in which R has the significance indicated above,

c) dehalogenating the 3,4-dichlorobutyl triorgano oxysilane obtained in step b) with sodium metal and

d) isolating the product according to Formula I.

5,073,645

CVD-COMPATIBLE TUNGSTEN HALOGEN PHOSPHINE COMPLEX COMPOUNDS AND METHODS FOR THE PRODUCTION THEREOF

Thomas Kruck, Erfstadt; Norbert Behrendorf, Cologne, and Heiko Faubel, Huerth, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

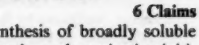
Filed Jun. 22, 1989, Ser. No. 370,040

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828125

Int. Cl.[5] C07F *11/00*

U.S. Cl. 556—13 **10 Claims**

1. A chemical vapor deposition-compatible tungsten halogen phosphine complex compound having the formula:



wherein:

X is chosen from the group consisting of fluorine and chlorine; and

L is chosen from the group consisting of molecular nitrogen (N_2), acetone ($(CH_3)_2CO$) and other ketones and aldehydes, carbon monoxide (CO), acetonitrile (CH_3CN) and other nitriles, diphenylethine ($C_6H_5{=}CC_6H_5$) and other ethines, diethylether (Et_2O), tetrahydrofurane (THF) and other open-chained or cyclic ethers, benzene (C_6H_6) and other aromatics ethene (C_2H_4), 1, 5-cyclooctadiene (COD), cycloheptatriene (CHT) and other mono, di, and triolefins, whereby two single-tooth ligands L will be replaced by one μ^4-ligand or three-tooth ligands L will be replaced by one μ^6-ligands and n is a whole number from 0 to 5 and wherein when n is OX is not fluorine.

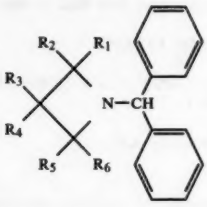
5,073,646

SUBSTITUTED 1-DIPHENYLMETHYL AZETIDINES

Augusto C. Pinol; Jordi F. Constansa, and Juan P. Corominas, all of Barcelona, Spain, assignors to Laboratorios Del Dr. Esteve, S.A., Barcelona, Spain

Filed Jun. 20, 1990, Ser. No. 541,056
Claims priority, application France, Jun. 29, 1989, 89 08696
Int. Cl.[5] C07D 205/04
U.S. Cl. 548—953 3 Claims

1. New azetidines, having the formula (I)



(I)

in which

R_3 represents a radical having up to five carbon atoms selected from the group consisting of an amino radical, an alkylamino radical, a dialkylamino radical, a cycloalkylamino radical, an acylamino radical, an alkylacylamino radical, an aminomethyl radical, an alkylaminomethyl radical, an acylaminomethyl radical or an alkylacylaminomethyl radical, in which radicals each acyl fragment may be substituted with one or more halogen atoms; and R_1, R_2, R_4, R_5 and R_6 represent a hydrogen atom or a lower alkyl radical, with the proviso that at least one of them represents a lower alkyl radical, or their physiologically acceptable salts.

5,073,647

REDUCTION AND INHIBITION OF ETU CONTENT IN ALKYLENEBISDITHIOCARBAMATES

Pieter C. Diepenhorst; Pieter Kool, both of Zuid-Holland, and Jacobus A. M. Nouws, Etten-leur, all of Netherlands, assignors to Pennwalt France S.A., Plaisir, France

Filed Apr. 24, 1990, Ser. No. 513,735
Int. Cl.[5] C07C 61/00, 333/00; A61K 31/21
U.S. Cl. 562—27 13 Claims

1. A method of stabilizing alkylenebisdithiocarbamates (EBDC), the EBDC consisting essentially of a metal salt or coordination complex of an alkylenebisdithiocarbamic acid, comprising mixing with the EBDC an amount of chloralkydrate effective to reduce the content of alkylenethiourea in the EBDC.

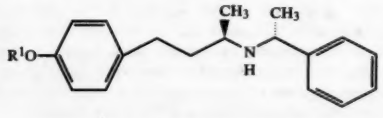
5,073,648

4-(4-ALKOXYPHENYL)-2-BUTYLAMINE DERIVATIVE AND PROCESS THEREFOR

Sanji Hagishita, Nara, and Kaoru Seno, Hyogo, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Jan. 25, 1991, Ser. No. 645,737
Claims priority, application Japan, Feb. 23, 1990, 2-43547
Int. Cl.[5] C07C 217/54
U.S. Cl. 564—374 1 Claim

1. An optically active (+)—secondary amine of the formula:



wherein R^1 is lower alkyl, or acid addition salt thereof.

5,073,649

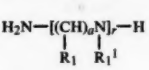
PROCESS FOR PRODUCING A POLYALKYLENE POLYAMINE

Yasushi Hara; Nobumasa Suzuki, both of Shin-nanyo; Yukio Ito, Kudamatsu, and Kazuhiko Sekizawa, Shin-nanyo, all of Japan, assignors to Tosoh Corporation, Shin-nanyo, Japan

Filed Feb. 9, 1989, Ser. No. 307,943
Claims priority, application Japan, Feb. 10, 1988, 63-27489; Dec. 5, 1988, 63-306150
The portion of the term of this patent subsequent to Jan. 1, 2008, has been disclaimed.
Int. Cl.[5] C07C 209/00
U.S. Cl. 564—479 7 Claims

1. A process for preparing a polyalkylene polyamine having an increased number of alkylene units from a starting material selected from the group consisting of ammonia and alkylenamines and wherein the alkylenamine starting material is selected from the group consisting of:

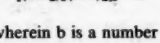
compounds represented by the following formula:



wherein a is a number from 2 to 6, r is a number from 0 to 6,

R_1 represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and

R_1^1 represents a group represented by the following formula:



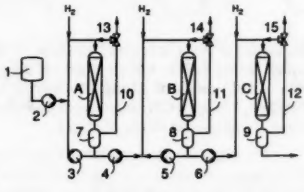
wherein b is a number from 1 to 6, d is 0 or 1, and s is a number from 0 to 4 and further wherein the starting material is reacted with an alkanolamine in the presence of a catalyst having a niobium-containing substance supported on a carrier which catalyst on a carrier has been calcined at a temperature of 400° C. to 800° C.

5,073,650

PREPARATION OF 1,4-BUTANEDIOL

Uwe Stabel, Edingen-Neckarhausen; Hans-Juergen Gosch, Bad Durkheim; Rolf Fischer, Heidelberg; Wolfgang Harder, Weinheim, and Claus Hechler, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 20, 1991, Ser. No. 672,671
Claims priority, application Fed. Rep. of Germany, Mar. 21, 1990, 4009029
Int. Cl.[5] C07C 29/149, 31/20
U.S. Cl. 568—864 8 Claims



1. A process for the preparation of 1,4-butanediol by catalytically hydrogenating maleic anhydride in the presence of an alcohol, at elevated temperature and elevated pressure and with the aid of a cobalt-containing catalyst, which comprises partially hydrogenating the reaction mixture in a first hydrogenation step at from 100° to 200° C. and at from 30 to 200 bar and subsequently post-hydrogenating the product of this first

hydrogenation step, without further work-up at higher temperatures and pressure than in the first hydrogenation step, in a second hydrogenation step at from 200° to 300° C. and at from 200 to 350 bar.

5,073,651

PROCESS FOR THE PREPARATION OF EXTENSIVELY FLUORINATED ALKYL BROMIDES

Klaus Raab, Burgkirchen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 26, 1990, Ser. No. 604,872

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1989, 3937567

Int. Cl.[5] C07C *17/20*

U.S. Cl. 870—170 **9 Claims**

1. A process for the preparation of an extensively fluorinated alkyl bromide from a compound of the formula

$$X—(CF_2)_n—I \qquad (I)$$

in which: X is H, F, Cl, Br, I or $(CF_3)_2CF$— and n is 1 to 16, comprising: reacting, in at least one dipolar aprotic solvent, 1 mol of bonded iodine atom of the compound of the formula (I) with 1 to 4 mol of bromide ions which are present as salts with at least one of the following cations: alkali metal, alkaline earth metal, copper or substituted or unsubstituted ammonium, at 120° to 200° C. under normal atmospheric pressure or under the autogenous pressure of the reaction mixture so that the iodine in the compound of formula (I) is replaced partly by bromine.

5,073,652

PROCESS FOR PREPARING AROMATIC HYDROCARBONS

Hisashi Katsuno, and Michio Sugimoto, both of Sodegaura, Japan, assignors to Research Association for Utilization of Light Oil, Tokyo, Japan

Filed Sep. 21, 1990, Ser. No. 586,343

Claims priority, application Japan, Sep. 25, 1989, 1-248616

Int. Cl.[5] C07C *2/52*

U.S. Cl. 585—419 **9 Claims**

1. In a process for preparing aromatic hydrocarbons from a hydrocarbon having from 6 to 12 carbon atoms with the aid of a catalyst consisting essentially of at least one metal belonging to group VIII of the periodic table, a macroporous zeolite and a halogen, the improvement which comprises feeding the hydrocarbon having from 6 to 12 carbon atoms in admixture with hydrogen in a ratio with respect to a mole of the hydrocarbon ranging from 0 to less than 1 mole; and contacting said mixture with said catalyst.

5,073,653

AROMATIC ALKYLATION PROCESSES

James R. Butler, Houston, Tex., assignor to Fina Technology, Inc., Dallas, Tex.

Filed Jun. 23, 1989, Ser. No. 371,502

Int. Cl.[5] C07C *2/64*

U.S. Cl. 585—449 **18 Claims**

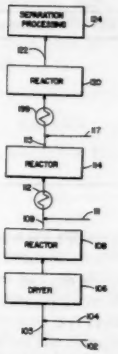
1. In a process for the liquid phase alkylation of an aromatic substrate with a C_2–C_4 alkylating agent in a multistage reaction system comprising a plurality of series connected reaction stages containing an alkylation catalyst and including an initial reaction stage and a final reaction stage, the steps comprising:

operating said reaction stages under conditions of temperature and pressure effective to cause alkylation of said aromatic substrate by said alkylating agent in the presence of said catalyst, said pressure being above the vapor pressure of said aromatic substrate and below the vapor pressure of said alkylating agent at said temperature conditions;

supplying a feedstock comprising said aromatic substrate and said alkylating agent to the initial reaction stage in relative amounts to provide a first mole ratio of said aromatic substrate to said alkylating agent;

withdrawing an effluent comprising a mixture of said aromatic substrate and alkylated product from each reaction stage preceding said final reaction stage and supplying said effluent to the next succeeding reaction stage

supplying said alkylating agent along with said effluent to the next succeeding reaction stage to provide an overall



progression across said multi-stage reaction system of a decreasing mole ratio of said aromatic substrate to said alkylating agent in an amount to provide a mole ratio of said aromatic substrate to said alkylating agent for said final reaction stage which is less than said first mole ratio supplied to said initial reaction stage; and

withdrawing an effluent from said final reaction stage comprising a mixture of said aromatic substrate and alkylated product.

5,073,654

SYNTHESIS OF THE 5- AND 6- METHYLTETRALINS BY CONTINUOUS METHYLATION OF TETRALIN

Blaise J. Arena, Des Plaines, and Paul R. Kurek, Barrington, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 26, 1990, Ser. No. 633,873

Int. Cl.[5] C07C *2/68*

U.S. Cl. 585—467 **9 Claims**

1. A method of preparing a mixture of 5-methyltetralin and 6-methyltetralin by the alkylation of tetralin with methanol with at least 65% conversion and no more than about 120% conversion of tetralin and at least 65% selectivity to 5-methyltetralin and 6-methyltetralin formation, comprising methylating tetralin with methanol in a tetralin-methanol feedstock containing from about 24 to about 1.4 molar proportions of tetralin per mole of methanol in the presence of zeolite β at alkylation conditions.

5,073,655

METHOD FOR PREPARING DIARYLALKANES

Philip J. Angevine, Woodbury; Ivy D. Johnson, Medford; David O. Marler, Deptford, and John P. McWilliams, Woodbury, all of N.J., assignors to Mobil Oil Corp., Fairfax, Va.

Continuation-in-part of Ser. No. 254,524, Oct. 6, 1988, Pat. No. 4,954,325, which is a continuation-in-part of Ser. No. 98,176, Sep. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 890,268, Jul. 29, 1986, abandoned. This application Jul. 27, 1990, Ser. No. 559,242

The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

Int. Cl.[5] C07C *15/16*

U.S. Cl. 585—467 **22 Claims**

1. A process for producing a diarylalkane from a feedstock

containing at least one alkylatable aromatic hydrocarbon compound and an aromatic alkylating agent having at least one alkylating group, said process comprising contacting said feedstock with a catalyst composition under alkylation reaction conditions to produce an alkylate product containing at least one diarylalkane compound, and said catalyst composition comprising a synthetic porous crystalline material characterized by an X-ray diffraction pattern including values substantially as follows:

Interplanar d-Spacing (A)	Relative Intensity, I/I° × 100
12.36 ± 0.4	M-VS
11.03 ± 0.2	M-S
8.83 ± 0.14	M-VS
6.18 ± 0.12	M-VS
6.00 ± 0.10	M-M
4.06 ± 0.07	W-S
3.91 ± 0.07	M-VS
3.42 ± 0.06	VS

5,073,656

HIGH ETHYLENE TO ETHANE PROCESSES FOR OXIDATIVE COUPLING

Richard B. Chafin, Hurricane, and Barbara K. Warren, Charleston, both of W. Va., assignors to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.

Filed Sep. 19, 1989, Ser. No. 409,544
Int. Cl.[5] C07C *2/00*
U.S. Cl. 585—500 29 Claims

1. A process for oxidative coupling of alkane comprising methane to heavier hydrocarbons comprising ethane and ethylene, comprising feeding the alkane, reactive oxygen-containing material and halogen-containing vapor phase additive to a reaction zone containing a catalytically effective amount of oxidative coupling catalyst said oxidative coupling catalyst comprising at least one catalytically active barium and/or strontium compound and metal oxide combustion promoter comprising at least one Group IVA or Group IIIB metal oxide and other than a silica combustion promoter; maintaining the reaction zone under oxidative coupling conditions to convert at least a portion of the methane to ethylene and ethane, and withdrawing from the reaction zone an effluent containing ethylene and ethane produced in the reaction zone, wherein the metal oxide and halogen-containing vapor phase additive are provided in amounts sufficient to provide an ethylene to ethane mole ratio in the effluent of at least about 2.5.

5,073,657

VAPOR PHASE MODIFIERS FOR OXIDATIVE COUPLING

Barbara K. Warren, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Sep. 19, 1989, Ser. No. 409,361
Int. Cl.[5] C07C *2/00*
U.S. Cl. 585—500 17 Claims

1. A process for oxidative coupling of alkane of 1 to 3 carbon atoms to heavier hydrocarbon comprising contacting the alkane in the presence of reactive oxygen-containing material under oxidative coupling conditions with a catalytically-effective amount of oxidative coupling catalyst contained in a reaction zone and feeding to the reaction zone intermittently or continuously an amount of at least one volatilized metal compound comprising metal which is more basic than lithium other than volatilized aluminum sufficient to inhibit the rate of vapor phase alkane conversion reactions.

5,073,658

CATALYST COMPRISING TiO_2 DISPERSED PHASE ON A MONOLAYER OF SiO_2 ON ALUMINA SUPPORT

Ramzi Y. Saleh, Flemington; Stuart L. Soled, Pittstown, and Nicholas C. Dispenziere, Wall, all of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jan. 22, 1991, Ser. No. 644,959
Int. Cl.[5] C07C *2/10*; B01J *21/12*
U.S. Cl. 585—530 5 Claims

1. A catalyst comprising SiO_2 present as a substantial monolayer on the surfaces of a support selected from the group consisting of gamma aluminum oxide, gamma gallium oxide and gamma indium oxide, said oxide having a surface area within the range of from about 100 to about 400 m^2/g, and TiO_2 present on the surfaces of said SiO_2 monolayer, the quantity of SiO2 present in said catalyst being in the range of from about 5 to about 20% by weight based on the weight of said metal oxide support, and the ratio of TiO_2 to SiO_2 on a weight basis being in the range of from about 1:5 to about 2:1.

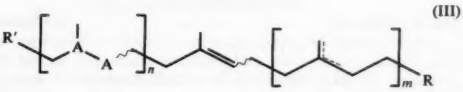
5,073,659

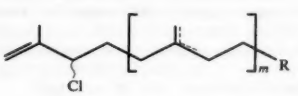
PROCESS FOR THE PREPARATION OF TERPENES

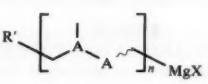
Kichisaburo Hamamura, Chiba; Yutaka Ohnuki, Aichi; Yukio Narabe, Ibaraki; Yoshihiro Hisatake, Ibaraki; Takashi Banba, Ibaraki, and Shizumasa Kijima, Chiba, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

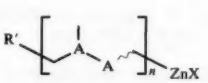
Filed Aug. 10, 1990, Ser. No. 565,569
Claims priority, application Japan, Aug. 22, 1989, 1-215736; Nov. 1, 1989, 1-285633
Int. Cl.[5] C07C *2/00*
U.S. Cl. 585—600 6 Claims

1. A process for producing a terpene compound having the formula (III), which comprises reacting an allylic halide having the formula (I) with a Grignard reagent having the formula (II) in the presence of anhydrous zinc chloride and a copper compound or an organic zinc halide compound having the formula (IV) in the presence of a copper compound, provided that when A-A is C-C, R′ is hydrogen and when A-A is C=C, X is chlorine.

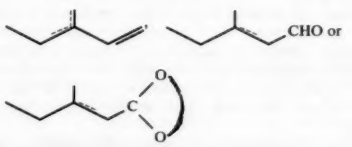






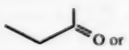


[wherein R represents a group represented by the formula:

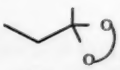


(wherein the

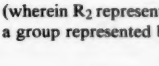
group represents a heterocyclic group containing two oxygen atoms as heteroatoms), a group represented by the formula:



or

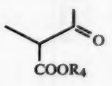


a hydroxyl group, a group represented by the formula: $-OR_1$ (wherein R_1 represents an acetyl (Ac) group, a propionyl group or a benzyl, methoxymethyl or tetrahydrofurfuryl group), a group represented by the formula:



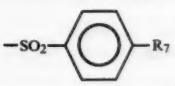
(wherein R_2 represents a hydrogen atom or an Ac group), a group represented by the formula:

(wherein R_3 represents a hydrogen atom or a methyl or ethyl group), a group represented by the formula:

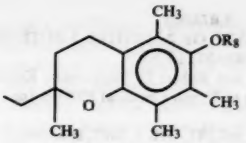


(wherein R_4 represents a methyl or ethyl group), a group represented by the formula:

(wherein R_5 and R_6 may be the same or different from each other and each represent a hydrogen atom or a methyl ethyl or isopropyl group), a group represented by the formula:



(wherein R_7 represents a hydrogen atom or a methyl group) or a group represented by the formula:



(wherein R_8 represents a hydrogen atom or a hydroxyl-protective group); R' represents a hydrogen atom or a straight-chain or branched alkyl, alkoxyalkyl, aralkyl, cyclic alkyl or halogen-substituted alkyl group; m represents 0 to 3, n is 1 to 3, A-A is C-C or C=C and X is bromine or chlorine].

5,073,660

Patent Not Issued For This Number

5,073,661

PROCESS FOR THE PREPARATION OF HYDROCARBONS

Bob Scheffer, and Andras G. T. G. Kortbeek, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 19, 1990, Ser. No. 638,882
Int. Cl.[5] C07C *1/00*
U.S. Cl. 585—640 **19 Claims**

1. Process for the preparation of hydrocarbons, wherein a feed comprising methanol is contacted at reaction conditions with a catalyst comprising:

i) a porous carrier material selected from the group comprising silica, alumina, and mixtures thereof;

ii) cobalt as a metal component deposited on the porous carrier; and

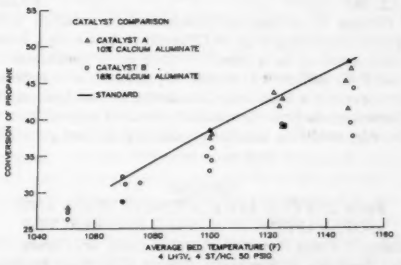
iii) a promotor selected from the group comprising zirconium, titanium, chromium, ruthenium, iron, magnesium, zinc, thorium and uranium.

5,073,662

CATALYST AND PROCESS FOR DEHYDROGENATION AND DEHYDROCYCLIZATION

Michael E. Olbrich, Naperville, Ill., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 23, 1990, Ser. No. 513,407
Int. Cl.[5] C07C *5/333*
U.S. Cl. 585—660 **12 Claims**



1. In a process wherein hydrocarbons are contacted with a catalyst composition comprising a zinc aluminate support and a metal catalyst selected from the group consisting of Group VIII metals, the improvement comprising:

adding calcium aluminate to said zinc aluminate support in the amount in the range of from about 5 to about 25 weight percent, based upon the total combined weight of said zinc aluminate and said calcium aluminate; and

recovering a reactor effluent product.

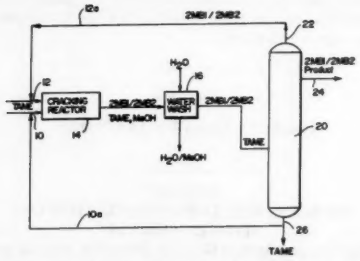
5,073,663
INCREASING THE LEVEL OF 2-METHYL-2-BUTENE IN ISOAMYLENE

Gustavo Cerri, Boonton, and Robert C. Michaelson, Kinnelon, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation of Ser. No. 103,287, Oct. 1, 1987, abandoned. This application Jan. 31, 1990, Ser. No. 472,844

Int. Cl.[5] C07C *5/23*

U.S. Cl. 585—668 **31 Claims**



1. The method for converting 2-methyl-1-butene to 2-methyl-2-butene comprising:

providing a hydrocarbon stream comprising isoamylene including 2-methyl-1-butene and 2-methyl-2-butene in a ratio within the range of 1:1 to 5;

adding a tertiary alkyl ether to said isoamylene to form a mixture;

passing said mixture of isoamylene and tertiary alkyl ether which is essentially devoid of water at a temperature within the range of 30° C. up to 60° C. and an LHSV within the range of 1 to 30 $hr^{31\ 1}$ over an acidic ion exchange resin catalyst to produce a reaction product including 2-methyl-1-butene, 2-methyl-2-butene an ether, and an alcohol wherein said 2-methyl-2-buten and 2-methyl-1-butene are present in said reaction product in a ratio of 6 to 12:1.

5,073,664
DIMERIZATION OF ALKANES WITH BARIUM PEROXIDE

Vincent A. Durante, West Chester, and James E. Lyons, Wallingford, both of Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.

Filed Mar. 11, 1991, Ser. No. 667,733

Int. Cl.[5] C07C *2/00*

U.S. Cl. 585—700 **5 Claims**

1. Process for preparing branched-chain paraffins which comprises contacting a C_3 or C_4 hydrocarbon with a barium peroxide oxidizer in a reaction zone at a temperature of 200°–450° C., sufficient to oxidatively dimerize said hydrocarbon, recovering a branched-chain dimer of said hydrocarbon and barium oxide from the reaction zone, and regenerating said oxidizer by oxidizing said barium oxide to barium peroxide.

5,073,665
PROCESS FOR ALKYLATING OLEFINS AND ISOPARAFFINS IN A FIXED BED REACTOR

Jonathan E. Child, Sewell, N.J.; Albin Huss, Jr., Chadds Ford, Pa.; Frederick J. Krambeck, Cherry Hill, N.J.; Francis P. Ragonese, Cherry Hill, N.J.; Robert T. Thomson, Voorhees, N.J., and Sergei Yurchak, Media, Pa., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Jul. 31, 1990, Ser. No. 560,397

The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

Int. Cl.[5] C07C *2/58*

U.S. Cl. 585—722 **21 Claims**

1. A process for producing an alkylate product from a feedstock containing at least one isoparaffin and at least one olefin, said process comprising contacting said feedstock under alkylation reaction conditions with at least one fixed bed of catalyst composition, said catalyst composition comprising a synthetic zeolite which is unpromoted by a Lewis acid and which is characterized by an X-ray diffraction pattern including values substantially as follows:

Interplanar d-Spacing (A)	Relative Intensity, I/I° × 100
12.36 ± 0.4	M–VS
11.03 ± 0.2	M–S
8.83 ± 0.14	M–VS
6.18 ± 0.12	M–VS
6.00 ± 0.10	M–M
4.06 ± 0.07	W–S
3.91 ± 0.07	M–VS
3.42 ± 0.06	VS

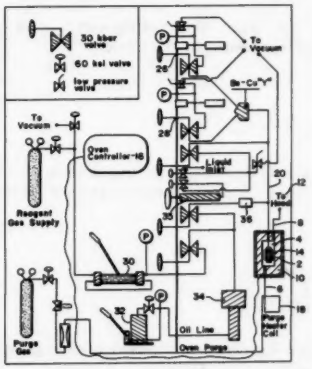
5,073,666
HYDROCARBON SYNTHESIS FROM LOWER ALKANES AT ADVANCED TEMPERATURES AND HIGH PRESSURES

Thomas S. Zemanian, Port Jefferson, N.Y.; Thomas Gold, Ithaca; William B. Streett, Ithaca, and John A. Zollweg, Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 380,190, Jul. 14, 1989, abandoned. This application May 3, 1991, Ser. No. 697,737

Int. Cl.[5] C07C *2/00, 2/02, 2/54*

U.S. Cl. 585—734 **15 Claims**



1. A process for converting a feedstock consisting essentially of one or more C_1–C_3 hydrocarbons to product hydrocarbons having up to 12 carbon atoms which comprises heating in the absence of catalyst one or more C_1–C_3 alkane hydrocarbons at a temperature from about 625 K to about 775 K at a pressure from about 40,000 psi (267 MPa) to about 70,000 psi (467 MPa).

5,073,667
PROCESS FOR THE ISOMERIZATION OF A HYDROCARBON FEED

Gregory V. Tonks, and Anne E. L. M. M. Verstappen Declercq, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 9, 1990, Ser. No. 594,467

Claims priority, application United Kingdom, Apr. 11, 1990, 9008289

Int. Cl.[5] C07C *5/13*

U.S. Cl. 585—738 **11 Claims**

1. Process for the isomerization of a hydrocarbon feed con-

taining hydrocarbons comprising at least 4 carbon atoms, which process comprises the following process steps:

a) isomerizing a hydrocarbon stream in the presence of hydrogen, and an isomerization catalyst yielding an isomerisate;

b) separating at least part of the isomerisate of step a) into a hydrogen-containing gas and a hydrocarbon effluent;

c) contacting at least part of the hydrocarbon effluent with a separatory molecular sieve capable of adsorbing normal hydrocarbons, whereby a product stream containing branched hydrocarbons is separated and other hydrocarbons are adsorbed;

d) desorbing adsorbed hydrocarbons from the separatory molecular sieve; and

e) passing at least part of the hydrocarbons thus desorbed to isomerization step a), in which process at least part of the feed is added to at least part of the isomerisate of step a) before the isomerisate is separated in step b).

5,073,668

PROCESS FOR THE DEALUMINATION AND ION EXCHANGE OF ZEOLITES

Elliot P. Hertzenberg, Wilmington, Del.; Brendan D. Murray, Houston, Tex.; Gary M. Pasquale, Lansdale, Pa., and Bruce H. C. Winquist, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 442,861, Nov. 28, 1989. This application Jun. 17, 1991, Ser. No. 716,154

Int. Cl.[5] C07C *5/13*; B01J *29/18*

U.S. Cl. 585—739 **15 Claims**

1. A process for the hydroisomerization of normal paraffins having from about 4 to about 10 carbon atoms which comprises contacting said paraffins with hydrogen and a zeolite catalyst comprising at least one metal selected from Group VIII and a zeolite prepared by a process which comprises contacting said zeolite with an about 0.5 M to about 3 M nitric acid solution containing ammonium nitrate in an amount sufficient to fully exchange said sodium ions in said zeolite for ammonium and hydrogen ions and subsequently calcining at a temperature in the range between about 350° C. and about 650° C.

5,073,669

METHOD FOR AROMATIC HYDROCARBON RECOVERY

Paulino Forte, Yonkers, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Mar. 9, 1989, Ser. No. 321,033

Int. Cl.[5] C07C *7/00*; C10G *17/04*

U.S. Cl. 585—808 **7 Claims**

1. In a method for recovering aromatic hydrocarbons from an extract phase from an aromatic-selective, solvent extraction zone which comprises the steps of:

(a) introducing the extract phase containing aromatic hydrocarbons, non-aromatic hydrocarbons and aromatic-selective solvent into an upper section of a stripping zone;

(b) introducing a stripping medium into a lower section of the stripping zone;

(c) withdrawing from the upper section of the stripping zone a first vapor fraction comprising water and non-aromatic hydrocarbons;

(d) withdrawing from a point at an intermediate section of the stripping zone a second vapor fraction comprising aromatic hydrocarbons, water and solvent;

(e) passing the second vapor fraction to a rectification zone;

(f) withdrawing from an upper section of the rectification zone a third vapor fraction comprising aromatic hydrocarbons and water;

(g) condensing the third vapor fraction to provide an aromatic hydrocarbon stream and a liquid water stream;

(h) passing at least a portion of the aromatic hydrocarbon stream into the upper section of the rectification zone;

(i) withdrawing from the lower section of the rectification zone a rectification zone bottoms comprising solvent and aromatic hydrocarbons;

(j) passing at least a portion of said rectification zone bottoms to the stripping zone; and

(k) withdrawing from the lower section of the stripping zone a stripper bottoms stream comprising aromatic selective solvent; the improvement which comprises introducing substantially the entire rectification zone bottoms at or near the point in the intermediate section of the stripping zone where the second vapor fraction is withdrawn.

5,073,670

PREPARATION OF A DIMETHYLTETRALIN

David L. Sikkenga, Wheaton, Ill.; Joyce D. Lamb, Ringgold, Ga.; Ian C. Zaenger, Wheaton, Ill., and Gregory S. Williams, Tampa, Fla., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 316,308, Feb. 27, 1989, Pat. No. 4,950,825, which is a continuation-in-part of Ser. No. 211,000, Jun. 24, 1988, abandoned. This application Jul. 20, 1990, Ser. No. 556,297

The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.

Int. Cl.[5] C07C *15/24*

U.S. Cl. 585—320 **52 Claims**

1. A method for preparing one or more dimethyltetralins from 5-(o-,m-, or p-tolyl)-pent-1- or -2-ene or 5-phenyl-hex-1- or -2-ene as the first feedstock, comprising: contacting the first feedstock in liquid form with a solid cyclization catalyst comprising an acidic ultra-stable crystalline aluminosilicate molecular sieve Y-zeolite that has a silica-to-alumina molar ratio of from about 4:1 to about 10:1, pore windows provided by twelve-membered rings containing oxygen and a unit cell size of from 24.2 to about 24.7 angstroms, and that contains from about 0.05 up to about 3.5 weight percent of sodium, calculated as elemental sodium, and based on the weight of the zeolite and that is substantially free of adsorbed water, and at an elevated temperature and at a pressure that is sufficiently high to maintain the first feedstock substantially in the liquid phase, to thereby cyclize the first feedstock to form a first liquid product comprising one or more dimethyltetralins, wherein water is at a concentration in the first feedstock of from zero up to less than about 0.5 weight percent, based on the weight of the feedstock, wherein (1) when the first feedstock comprises 5-(o-tolyl)-pent-1 or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,5-, 1,6-, 2,5- or 2,6-dimethyltetralin or a mixture thereof, (2) when the first feedstock comprises 5-(m-tolyl)-pent-1 or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,5-, 1,6-, 1,7-, 1,8-, 2,5-, 2,6-, 2,7- or 2,8-dimethyltetralin or a mixture thereof, (3) when the first feedstock comprises 5-(p-tolyl)-pent-1 or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised by 1,7-, 1,8-, 2,7- or 2,8-dimethyltetralin or a mixture thereof, or (4) when the first feedstock comprises 5-phenyl-hex-1- or -2-ene, at least 80 weight percent of the dimethyltetralin product formed is comprised of 1,3-, 1,4-, 2,3-, 5,7-, 5,8- or 6,7-dimethyltetralin or a mixture thereof.

5,073,671

1-(BENZYL OR PYRIDYLMETHYL)-4 OR 5-AMINOMETHYL-PYRROLIDIN-2-ONES

Karl-Heinz Weber, Gau-Algesheim; Gerhard Walther, Bingen/-Rhein; Claus Schneider, Ingelheim/Rhein; Dieter Hinzen, Bingen/Rhein; Franz J. Kuhn, Gau-Algesheim, and Erich Lehr, Waldalgesheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

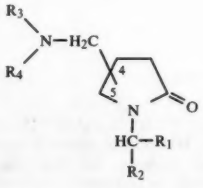
Division of Ser. No. 350,597, May 11, 1989, Pat. No. 4,996,224, which is a continuation of Ser. No. 199,291, May 26, 1988, Pat. No. 4,833,140, which is a division of Ser. No. 878,828, Jun. 26, 1986, Pat. No. 4,767,759, which is a continuation-in-part of Ser. No. 657,219, Oct. 3, 1984, abandoned. This application Dec. 21, 1990, Ser. No. 632,351

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1983, 3336024

Int. Cl.[5] **C07D** *401/06, 247/02*

U.S. Cl. 548—348 **1 Claim**

1. A compound of the formula



wherein R_1 is hydrogen or alkyl of 1 to 4 carbon atoms;

R_2 is 2-, 3- or 4-pyridyl, phenyl or mono- or di-substituted phenyl, where the substituents are each individually alkoxy of 1 to 2 carbon atoms, fluorine, chlorine, bromine, trifluoromethyl, alkyl of 1 to 4 carbon atoms, hydroxyl or nitro; and

R_3 and R_4, together with each other and the nitrogen atom to which they are attached, form an an imidazole ring;

where the aminomethyl substituent is attached to the 4- or 5-position of the pyrrolidine ring, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

5,073,672

CATALYST OF THE GALLOSILICATE TYPE AND ITS UTILIZATION FOR THE AROMATIZATION OF LIGHT C_2–C_4 GASES

Laurent Petit, Paris; Jean-Paul Bournonville, Cergy Pontoise; Jean-Louis Guth, Mulhouse; Francis Raatz, Acheres, and Alain Seive, Mulhouse, all of France, assignors to Institut Francais Du Petrole, Rueil Malaison, France

Division of Ser. No. 379,469, Jul. 12, 1989, Pat. No. 5,010,048. This application Mar. 14, 1991, Ser. No. 669,245

Claims priority, application France, Jul. 12, 1988, 88 09631

Int. Cl.[5] **C07C** *15/00*

U.S. Cl. 585—415 **8 Claims**

1. A process for the aromatization of a C_{2-4}-light-gas cut, comprising subjecting a feed of said cut to aromatization conditions, in the presence of a catalyst comprising by weight:

(a) 0.01 to 99.49% of a matrix chosen from the group consisting of alumina, silica, magnesia, and a clay; and

(b) 0.51 to 99.99% of a gallosilicate zeolite synthesized in a fluorine-containing medium having an MFI structure comprising:

a fluorine content of 0.02 to 1.5% by weight,

an Si^{IV}/Ga^{III} molar ratio at least equal to 8.6, and

an X-ray diffraction diagram chosen from the group consisting of the diagram in Table 1 having a monoclinical structure and the diagram in Table 2 having an orthorhombic structure.

5,073,673

PROCESS FOR THE PRODUCTION OF HIGH-OCTANE GASOLINE BLENDING STOCK

Kazuo Hirabayashi, Yokohama; Tadami Kondoh; Hiroaki Nishijima, both of Ebina; Shinichi Inoue, Yokohama; Kouji Adachi, Tokyo; Fumiho Igarashi, Yokohama, and Toshio Wakai, Kawasaki, all of Japan, assignors to Research Association for the Utilization of Light Oil, Japan

Filed May 30, 1990, Ser. No. 530,583

Claims priority, application Japan, May 31, 1989, 1-140105

Int. Cl.[5] **C07C** *12/02*

U.S. Cl. 585—415 **11 Claims**

1. A process for the production of a high-octane gasoline, wherein a light hydrocarbon containing one or more paraffins and/or olefins, each having 2 to 7 carbon atoms, is contacted in a reaction zone with a catalyst containing a crystalline aluminogallosilicate at a temperature of 350°–650° C. under a hydrogen partial pressure of not higher than 5 kg/cm^2, thereby obtaining a high-octane gasoline-containing product, characterized in that said crystalline aluminogallosilicate has a particle size in the range of about 0.1–10.0, that at least 80% by weight of said crystalline aluminogallosilicate has a particle size in the range of 0.1–5.0 μm, and that said crystalline aluminogallosilicate contains about 0.1–2.5% by weight of aluminum and about 0.1–5% by weight of gallium in the skeleton thereof.

5,073,674

ENVIRONMENTALLY SAFE CATALYTIC ALKYATION USING LIQUID ONIUM POLY (HYDROGEN FLUORIDES)

George A. Olah, 2252 Gloaming Way, Beverly Hills, Calif. 90210

Continuation-in-part of Ser. No. 511,655, Apr. 20, 1990, abandoned. This application Sep. 20, 1990, Ser. No. 585,540

Int. Cl.[5] **C07C** *2/68, 2/70*

U.S. Cl. 585—725 **20 Claims**

1. A process for alkylating an aliphatic hydrocarbon having between three and twelve carbon atoms and optionally containing an alkyl group of between one and four carbon atoms, with an alkenyl hydrocarbon having between two and twelve carbon atoms and optionally containing an alkyl group of between one and four carbon atoms, in the presence of a liquid onium polyhydrogen fluoride complex as the reaction medium and catalyst at a sufficient temperature pressure and time to form an alkylate thereof.

5,073,675

METHOD OF INTRODUCING SPECTINOMYCIN RESISTANCE INTO PLANTS

Jonathan Jones, Norwich, United Kingdom, and Pal Maliga, East Bruswick, N.J., assignors to DNA Plant Technology Corporation, Oakland, Calif.

Filed May 26, 1989, Ser. No. 357,493

Int. Cl.[5] **C12N** *5/14;* **A01H** *1/04*

U.S. Cl. 800—205 **5 Claims**

1. A dicotyledonous plant transformed with a DNA sequence conveying spectinomycin resistance in plants compris-

ing a recombinant expression cassette containing a DNA sequence encoding an enzyme having the activity of an aminoglycoside 3''-adenyltransferase which originates from shigella sps.

5,073,676

TOMATO ANTI-SENSE PECTIN ESTERASE

Ian G. Bridges, Cheshire; Wolfgang W. Schuch, Frodshan, and Donald Grierson, Shepshed, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 119,614, Nov. 12, 1987. This application Sep. 29, 1989, Ser. No. 419,779

Claims priority, application United Kingdom, Nov. 11, 1986, 8626879

Int. Cl.[5] C12N *15/29;* A01H *5/00*

U.S. Cl. 800—205 9 Claims

1. Recombinant DNA comprising:

an upstream promoter base sequence,

a base sequence for transcription into mRNA under control of said upstream promoter base sequence comprising coding and template strands, and

a downstream transcription terminator base sequence,

wherein the coding strand of said base sequence for transcription comprises an inverted sequence of bases complementary to a run of bases of pectin esterase mRNA, wherein the transcript of said base sequence for transcription substantially inhibits expression of tomato pectin esterase.

5,073,677

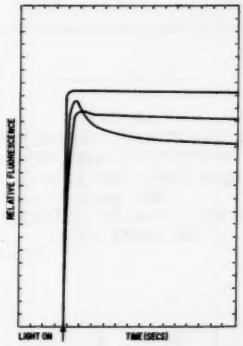
HERBICIDAL TOLERANT PLANTS CONTAINING RAT GLUTATHIONE S-TRANSFERASE GENE

Georgia Helmer, Apex, N.C.; John Duesing, Reihen, Switzerland; Steven Rothstein, Chapel Hill, N.C.; Liliana Scarafia, Chapel Hill, N.C.; Mary-Dell Chilton, Raleigh, N.C.; Hui-Chen J. Lai, and Chen-Pei D. Tu, both of State College, Pa., assignors to Ciba-Geigy Corporation, Ardsley, N.Y. and The Pennsylvania Research Corporation, University Park, Pa.

Continuation of Ser. No. 107,199, Oct. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 912,755, Sep. 26, 1986, abandoned. This application Aug. 4, 1989, Ser. No. 391,632

Int. Cl.[5] A01H *4/00;* C12N *15/05, 15/12*

U.S. Cl. 800—205 24 Claims



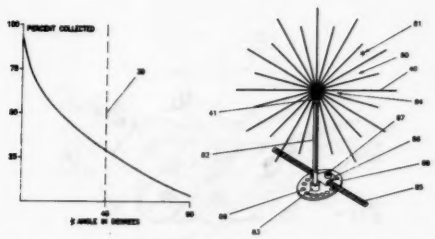
1. A transformed plant cell comprising a chimeric genetic sequence, said chimeric genetic sequence comprising a first genetic sequence coding for rat glutathione S-transferase, and one or more additional genetic sequences operably linked on either side of the first genetic sequence, wherein said first genetic sequence is capable of being expressed in a plant cell.

5,073,678

SPLINE BALL TERMINAL (SBT)

Roy B. Carpenter, Jr., Boulder, Colo., assignor to Lightning Eliminators & Consultants, Inc., Boulder, Colo.

Filed Aug. 21, 1990, Ser. No. 570,626
Int. Cl.[5] H02G *13/00*
U.S. Cl. 174—2 4 Claims



1. An improvement to a lightning rod mounted atop a protected facility. wherein the lightning rod comprises a tubular metal vertical shaft of at least 10 inches in length, a threaded mounting collar for the shaft, a base supporting the threaded mounting collar and the shaft; the base further comprising mounting holes, a connector fitting having at least a 1 ½ inch connection with the entire circumference of a ground conductor cable; the ground conductor cable having an earth ground connection; wherein the improvement comprises:

a spline assembly mounted atop the vertical shaft;

said spline assembly further

comprising individual splines centrally connected to a common electrical bond and outwardly pointing therefrom;

said splines oriented at least every 5 degrees in azimuth for a full 360 degrees horizontally and a full 120 degrees in elevation;

said splines having a length of at least 12 inches and a diameter large enough to carry a current well in excess of the average strike; and

said splines each having a tip which acts as a collector point for lightning strokes and an ionizer point for discharging ambient electrical charges;

thereby providing a near vertical attack angle to a collector for any lightning stroke approaching from either a vertical or horizontal direction.

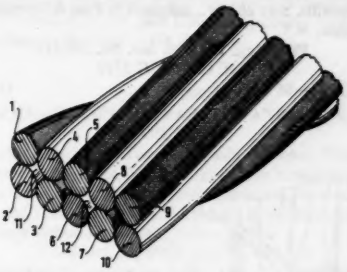
5,073,679

SUPERCONDUCTING CONDUCTOR HAVING MULTIPLE TRANSPOSED STRANDS WITH INTERNAL COOLING CHANNELS, AND METHOD OF MANUFACTURE

Christian Bencharab, Andelnans-Froideval; Patrick Bonnet, Cravanche, and Henri Nithart, Belfort, all of France, assignors to GEC Alsthom SA, Paris, France

Filed Jul. 5, 1990, Ser. No. 548,643
Claims priority, application France, Jul. 4, 1989, 89 08977
Int. Cl.[5] H01B *12/00*; H01L *39/24*
U.S. Cl. 174—15.5 4 Claims

1. A superconducting conductor comprising: a first fraction of prior-tinned strands (1, 3, 5, 7, 9, etc. . . .) and an additional fraction of non-prior-tinned strands (2, 4, 6, 8, 10, etc. . . .), said strands of the first fraction and of the additional fraction alternating regularly and within a coherent assembly being transposed and having tin melt bonded substantially point adherence between the prior-tinned strands and open channels (11, 12, etc. . . .) inside the superconducting conductor between



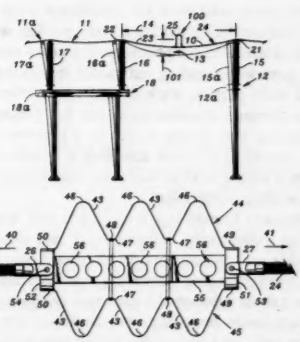
transposed non-prior-tinned strands for cooling liquid circulation.

5,073,680

SUBSTATION INTERCONNECTING ELECTRICAL CABLE CONDUCTOR CONNECTING DEVICE

James T. Kennedy, Sierra Madre, Calif., assignor to Southern California Edison, Rosemead, Calif.

Filed Oct. 9, 1990, Ser. No. 597,196
Int. Cl.[5] H02G *7/00*
U.S. Cl. 174—40 TD 20 Claims



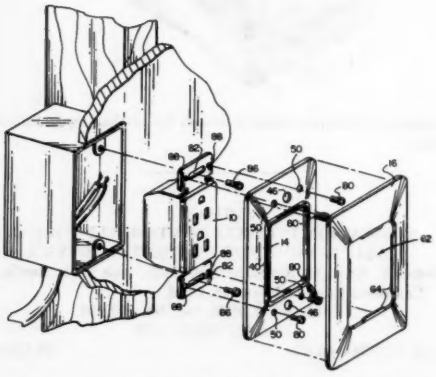
1. Interconnected electrical equipment comprising, in combination a first suspended electrically conductive cable having a free end, a second electrically conductive cable having a free end, the free ends being spaced apart and being adjacent to each other, a flexible conductive loop in series electrically with the respective free ends, and a tension retainer in series structurally with the two respective free ends, the tension retainer extending directly between the respective free ends thereby to retain the cables in a first suspended state under normal operative conditions and the flexible loop maintaining the cables in a second, suspended state under abnormal operative conditions, and the tension retainer including at least a pair of overlapping elements relatively movable with respect to each other and a shear pin for securing the elements in a first relatively overlapping non-movable position wherein the cables are held in the first suspended state with the elements in a first secured and immovable position such that the tension retainer is functional to retain the cables in the first suspended state and wherein a predetermined axial tension force on the elements shears the pin thereby to permit axial extension relatively of the elements and extension of the flexible loop such that the cables become extendible to the second suspended state and the tension retainer becomes non-functional in retaining the cables suspended.

5,073,681

TWO-PIECE WALL PLATE FOR ELECTRICAL DEVICE

Edward B. Hubben, Skaneateles, and Jean-Claude Marcou, Fayetteville, both of N.Y., assignors to Pass & Seymour, Inc., Syracuse, N.Y.

Filed Aug. 16, 1990, Ser. No. 568,511
Int. Cl.[5] H02G 3/14
U.S. Cl. 174—66 11 Claims



1. A two-piece wall plate for installation with at least one electrical wiring device having a body portion with an outer face of predetermined peripheral outline and a mounting strap with end portions extending outwardly in opposite directions from said body portion, each of said end portions having at least two openings therethrough, one for passage of a first screw securing said wiring device to a junction box and the other for receiving a screw attaching a portion of said wall plate to said wiring device, said wall plate comprising:

a) a base plate comprising:

i) integrally formed top, bottom and side first frame portions collectively defining inner and outer faces and inside and outside boundaries of said base plate;

ii) a bezel extending outwardly from said base plate outer face about substantially the entire periphery of said base plate inside boundary, and having a top surface and inwardly and outwardly facing side surfaces, said inwardly facing side surface defining a first opening of substantially the same configuration and dimensions as said predetermined outline;

iii) a second and a third opening in each of said top and bottom frame portions;

b) a cover plate comprising:

i) integrally formed top, bottom and side second frame portions collectively defining inner and outer faces and inside and outside boundaries of said cover plate;

ii) a first lip portion extending outwardly from said cover plate inner face about substantially the entire periphery of said cover plate outside boundary, said first lip portion having an inner boundary encompassing said base plate outer boundary;

iii) said inside boundary of said second frame portion defining a fourth opening of substantially the same configuration and dimensions as said outwardly facing wall of said bezel; and

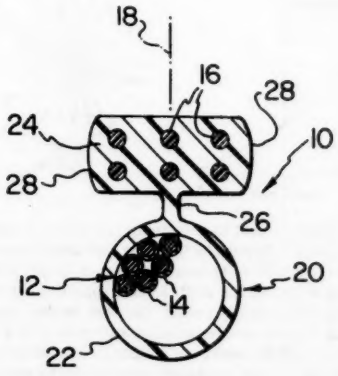
c) cooperative, first and second engagement means on said bezel outwardly facing side surface and said second frame portion inside boundary, respectively, for releasably retaining said base and cover plates in mutually engaged relation with said bezel extending through said fourth opening.

5,073,682

TELECOMMUNICATIONS CABLE

Jorg-Hein Walling, Beaconsfield; Oleg Axiuk, Pincourt, and Robert Dickenson, St. Lazare, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 9, 1990, Ser. No. 564,804
Int. Cl.[5] H01B 7/00, 13/00
U.S. Cl. 174—70 A 9 Claims



1. A telecommunications cable having a core comprising a plurality of individual insulated conductors and a cable load carrier comprising a plurality of tensile reinforcing members disposed in a group laterally on one side of and spaced from the core, and a jacket surrounding the core and load carrier and having one jacket portion surrounding the core and another jacket portion surrounding the group with each individual reinforcing member in the group embedded in the other jacket portion, and with the jacket portions both extending between the core and the group and being interconnected, the other jacket portion and the group of reinforcing members each having a thickness which extends in the lateral direction from the core and a width which is greater than the thickness and which extends normal to the thickness, and the two jacket portions capable of being separated along any desired length region of the cable.

5. A method of making a telecommunications cable comprising:

disposing a plurality of tensile reinforcing members in desired relative positions as a group laterally on one side of a core which comprises a plurality of individually insulated conductors,

the group of reinforcing members having a thickness across members of the group which extends in the lateral direction of the core and a width which extends normal to the thickness,

and forming a jacket around the core and around the group of reinforcing members with each reinforcing member embedded within the jacket, the jacket being formed with one jacket portion around the core and another jacket portion around the group with the two jacket portions both extending between the core and the group and being interconnected,

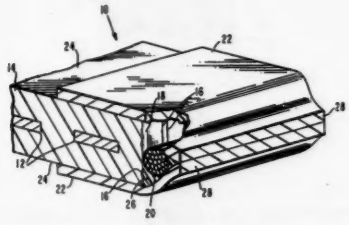
retaining the reinforcing members in the desired relative positions while the other portion of the jacket is being formed, with the other jacket portion having a thickness in the lateral direction of the core and a width which is greater than the thickness and which extends normal to the thickness, the jacket being formed so that at the interconnection, the two jacket portions are capable of being separated along any desired length region of the cable.

5,073,683

EDGE REPAIR AND REINFORCEMENT OF FLEXIBLE FLAT CABLES

Edward A. Anderson, Yorba Linda; Ernesto S. Sandi, Perris, and Mary K. White, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 21, 1990, Ser. No. 541,664
Int. Cl.[5] H01B 7/08
U.S. Cl. 174—117 FF 12 Claims



1. A tear resistant flexible flat cable assembly comprising:
a fully fabricated flat cable having edges in which micro-fissures, micro-cuts or other imperfections exist;
a strength member positioned adjacent the edges of said fabricated cable; and
bond material bonding said strength member to said cable edge and filling the micro-fissures, micro-cuts or other imperfections.

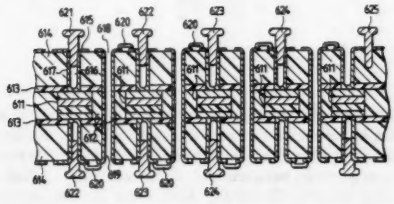
9. A method for minimizing and avoiding the occurrence of tears in an already fabricated flexible flat cable comprising the steps of:
positioning a strength member adjacent the edges of the fabricated cable for repair of any such tears due to micro-fissures, micro-cuts or other imperfections in the edges; and
bonding the strength member to the cable edges and within the micro-fissures, microcuts or other imperfections by a bond material.

5,073,684

SHEET TYPE STORAGE BATTERY AND PRINTED WIRING BOARD CONTAINING THE SAME

Takeshi Miyabayashi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Division of Ser. No. 425,952, Oct. 24, 1989, Pat. No. 5,019,468.
This application Dec. 10, 1990, Ser. No. 625,102
Claims priority, application Japan, Oct. 27, 1988, 63-271792; Oct. 28, 1988, 63-274251; Oct. 31, 1988, 63-274776; Oct. 31, 1988, 63-274778
Int. Cl.[5] H05K 1/00
U.S. Cl. 174—260 12 Claims



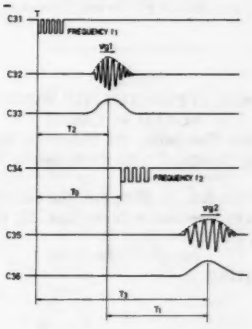
1. A printed wiring board for mounting circuit elements thereon, comprising:
a base plate comprising at least one sheet type storage battery including a negative electrode layer, a positive electrode layer and a solid electrolyte layer sandwiched between said positive and negative electrode layers;
preimpregnation plates laminated on both surfaces of said base plate; and
holes formed in said printed wiring board for electrically connecting said positive and negative electrode layers to the circuit elements, said holes being coated with copper coating at the inner walls thereof.

5,073,685

COORDINATE INPUT APPARATUS AND A WIRELESS INPUT PEN

Katsuyuki Kobayashi, Tokyo; Kiyoshi Kaneko, Yokohama; Ryohzou Yanagisawa, Matsudo; Yuichiroh Yoshimura, Yokohama; Atsushi Tanaka; Shinnosuke Taniishi, both of Kawasaki, and Takeshi Kamono, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 26, 1990, Ser. No. 603,625
Claims priority, application Japan, Oct. 27, 1989, 1-278668
Int. Cl.[5] G08C 21/00
U.S. Cl. 178—18 20 Claims



1. A coordinate input apparatus comprising:
a vibrating input pen for alternately generating a first vibration having a first frequency and a second vibration having a second frequency different from the first frequency;
a vibration transmitting member for transmitting the first and second vibrations input from said vibrating input pen by contacting the vibrating input pen;
vibration detection means coupled to said vibration transmitting member for detecting the first and second vibrations transmitted through said vibration transmitting member; and
derivation means for deriving a location of said vibrating input pen on said vibration transmitting member according to a transmission delay time between the first vibration and the second vibration detected by said vibration detection means.

5,073,686

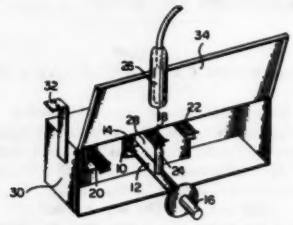
KNIFE SWITCH

Claude D. Gabriel, King of Prussia, Pa., assignor to Bombardier Corporation, Bensalem, Pa.

Filed Sep. 21, 1990, Ser. No. 586,555
Int. Cl.[5] H01H 1/42
U.S. Cl. 200—254 5 Claims

1. A knife switch comprising:
a conductive blade terminal for connection to a first circuit;
a pivoted conductor blade conductively connected to the blade terminal;
a first contact connectable to a first power source and positioned to be engaged by the blade in a closed position;
a second contact positioned also to be engaged by the blade when in said closed position and connected to a second circuit;
an insulator support for the blade terminal and said contacts to hold them in operative position;

a conductive bug stud supported on the conductor blade generally transverse to the plane of movement of the blade wherein said bug stud is adapted to be connected to a connector to a second source of power; and



an interfering insulator member positioned to normally permit passage of the bug stud and the blade to said closed position, said insulator member preventing passage of the bug stud and the blade to said closed position when said connector to a second power source is attached to the bug stud.

5,073,687

METHOD AND APPARATUS FOR WORKING PRINT BOARD BY LASER

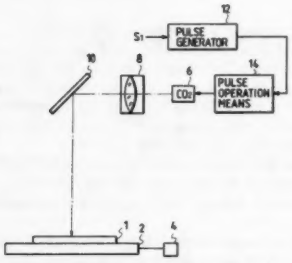
Hideho Inagawa, Yokohama, and Shigenobu Nojo, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1990, Ser. No. 541,374

Claims priority, application Japan, Jun. 22, 1989, 1-160281; Oct. 27, 1989, 1-278353

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.7 **6 Claims**



1. A method of forming a hole in a working object such as a print board or the like, comprising the steps of:

irradiating a working surface of the working object with a laser beam, and

converting the laser beam of a laser light source into a pulse signal having an initial oscillation and a final oscillation set to a high output oscillation, and an intermediate oscillation set to a low output oscillation or an oscillation whose output is gradually increased.

5,073,688

BODY TEMPERATURE RESPONSIVE TRANSPORT WARMING BLANKET

William C. McCormack, 3703 Woodland St., Ames, Iowa 50010

Filed Apr. 1, 1991, Ser. No. 678,438

The portion of the term of this patent subsequent to Apr. 16, 2008, has been disclaimed.

Int. Cl.[5] H05B *3/34*

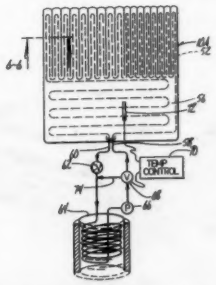
U.S. Cl. 219—212 **16 Claims**

1. A body temperature responsive warming blanket comprising,

a blanket having a first section integrally connected to a second section, said second section including a plurality of strips independently operable and adapted to provide access to selected areas of the body wrapped in said blanket,

heating means extending substantially throughout said first and second sections including said plurality of strips, and

a control circuit including said heating means and a skin



contact temperature sensor adapted to be attached to said body, and a temperature control means adapted to be adjusted to a predetermined desired body temperature which is substantially continuously maintained throughout operation and use of the blanket by said heating means being operative only as required and indicated by said temperature sensor to maintain said predetermined desired body temperature within a narrow range.

5,073,689

ZIRCONIA REFRACTORY HEATING ELEMENT

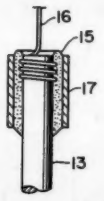
Katsuhiro Tabata, Ako; Masahiro Hayase, Bizen; Hajime Asami, Bizen; Hiroyuki Asakura, Bizen, and Kenji Mitsui, Bizen, all of Japan, assignors to Shinagawa Shirorenga Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 3, 1989, Ser. No. 306,441

Claims priority, application Japan, Feb. 6, 1988, 63-26329; May 18, 1988, 63-119138; Jul. 27, 1988, 63-187346; Aug. 24, 1988, 63-210353

Int. Cl.[5] H05B *6/02*; H01C *8/00*

U.S. Cl. 219—10.491 **2 Claims**



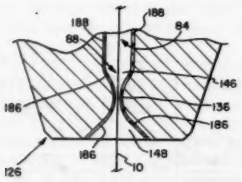
1. A zirconia heating structure which generates heat by passing a current, said structure comprising a zirconia heating element and a lead member for passing a current, wherein the junction portions between said zirconia heating element and said lead member for passing the current and the peripheries thereof are coated with a zirconia curing composition comprising a zirconia fiber, a zirconia powder, a water-soluble zirconium salt as a binder, an aqueous solution of said zirconium salt exhibiting an acidity, and yttria or a water-insoluble yttrium compound as a curing agent to join said lead member and said zirconia heating element.

5,073,690

LONG LASTING ELECTRICAL DISCHARGE MACHINE WIRE GUIDE

Lawrence W. Corbin; Charles Carson, both of Fort Wayne; Jule L. French, Yoder; Dwight P. Bieberich, and Donald E. Bieberich, both of Fort Wayne, all of Ind., assignors to Fort Wayne Wire Die, Inc., Fort Wayne, Ind.

Filed Feb. 23, 1989, Ser. No. 314,652
Int. Cl.[5] B23H *7/10*
U.S. Cl. 219—69.12 21 Claims



1. An electrical discharge machine wire guide mountable on a guide assembly for guiding a moving wire electrode, said guide comprising:

guide means having a wire hole extending between two openings for receiving the wire therethrough and guiding the wire;

a nib supporting said guide means, said nib having two passageways, each of said passageways communicating through a respective guide means wire hole opening with said guide means wire hole;

a wire guide body, said nib attached to said wire guide body; and,

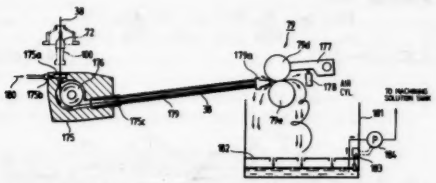
a coating of non-conductive material on at least one of said nib passageways for preventing electrical current flow between the wire and the guide assembly.

5,073,691

WIRE ELECTRODE FEEDING DEVICE IN WIRE CUT ELECTRIC DISCHARGE MACHINE

Takuji Magara; Takeshi Iwasaki; Toshio Suzuki, and Masahiro Yamamoto, all of Aichi, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

PCT No. PCT/JP89/00446, § 371 Date Dec. 29, 1989, § 102(e) Date Dec. 29, 1989, PCT Pub. No. WO90/12672, PCT Pub. Date Jan. 11, 1990
PCT Filed Apr. 27, 1989, Ser. No. 457,787
Int. Cl.[5] B23H *7/10*
U.S. Cl. 219—69.12 13 Claims



12. A method for feeding a wire electrode in a wire electrode discharge machine, said method comprising the steps of:

supplying a fluid from an inlet of a roller unit having a rotor;

conveying said wire electrode and rotating said rotor by said fluid;

passing said wire electrode through a pipe guide by said fluid;

winding said wire electrode by a winding mechanism having a pair of rollers provided near said fluid outlet of said pipe guide;

forming said winding mechanism so as to comprise a lever member secured to one of said rollers, and means for moving said lever member to open and close said winding rollers; and

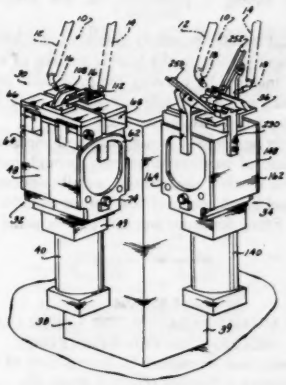
collecting said wire electrode and said fluid into a collecting tank.

5,073,692

AUTOMATIC WELDING ELECTRODE CAP CHANGER

Donald T. Jackson, 1159 Ashley, Troy, Mich. 48098, and Joel D. Robinson, 6573 Noble Rd., West Bloomfield, Mich. 48322

Filed Nov. 13, 1990, Ser. No. 611,790
Int. Cl.[5] B23K *11/30*
U.S. Cl. 219—86.8 22 Claims



1. An apparatus for replacing welding electrode caps mounted on welding electrodes comprising:

first linear drive means having a first reciprocally extendable and retractable drive member;

a first body, the body having a through bore through which the first linear drive means reciprocates;

first and second electrode cap engaging means, the first and second electrode cap engaging means disposed in opposed, inverted positions with respect to each other and pivotally connected at first ends to the first body;

first and second cam means formed in the first and second electrode cap engaging means, respectively, the first and second cam means being identical and disposed in opposed, inverted relation with respect to each other;

cam follower means, mounted on the first drive member and engaging the first and second cam means in the first and second electrode cap engaging means, for pivoting the first and second electrode cap engaging means between a first, spaced apart, open position and a second, closed position as the first drive member reciprocates; and

opposed knife edges formed on the first and second electrode cap engaging means, respectively, for engaging opposite sides of the joint between the electrode cap and the welding electrode to forcibly separate the electrode cap from the welding electrode as the first and second electrode cap engaging means pivot to the second position.

5,073,693

METHOD FOR JOINING METALLIC MEMBERS

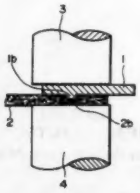
Hiroyoshi Kikuchi; Hiroto Kosuge, and Syunsuke Suzuki, all of Narashino, Japan, assignors to NDC Co., Ltd., Chiba, Japan

Filed Oct. 6, 1989, Ser. No. 417,945

Claims priority, application Japan, Feb. 8, 1989, 1-13085[U]; Feb. 8, 1989, 1-27370

Int. Cl.[5] B23K *11/14*

U.S. Cl. 219—93 2 Claims



1. A method for joining metallic members which comprises:

placing a joining surface of a porous metallic member in contact with a joining surface of a non-porous metallic member having a projection on the joining surface thereof,

pressing said metallic members against each other and forming a dense portion in the joining surface of said porous metallic member by pressing the projection provided on the joining surface of said non-porous metallic member into said porous metallic member, and

subsequently heating and joining said both metallic members by passage of an electric current through both metallic members, wherein said porous metallic member is a porous panel board, and said non-porous metallic member is a metal fitting for mounting said porous panel board.

5,073,694

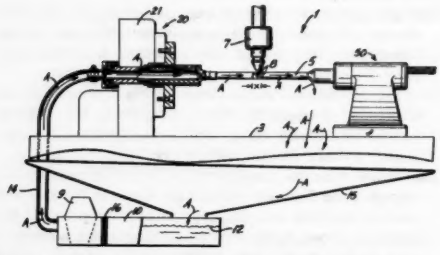
METHOD AND APPARATUS FOR LASER CUTTING A HOLLOW METAL WORKPIECE

Jeff M. Tessier, and Woodward G. Brown, both of Monument, Colo., assignors to Synthes (U.S.A.), Paoli, Pa.

Filed Feb. 21, 1991, Ser. No. 658,551

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.7 16 Claims



1. A method for laser cutting a predetermined pattern through a wall of a hollow metal workpiece, comprising:

pumping liquid coolant through a workpiece mounting means and the metal workpiece while cutting the pattern with a laser cutting means as the coolant flows through and contacts at least a portion of the inner surface of the workpiece, to flush out the dross that forms during cutting, such that adherence of the dross to the inner surface of the workpiece is minimized or eliminated.

5,073,695

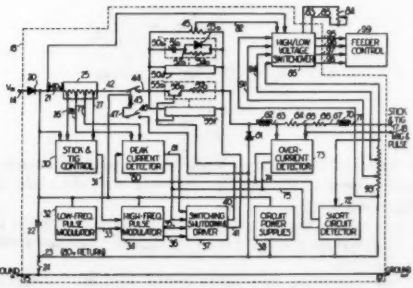
WELDING POWER SUPPLY WITH SHORT CIRCUIT PROTECTION

Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067

Continuation of Ser. No. 243,054, Feb. 9, 1988, Pat. No. 4,910,635, which is a division of Ser. No. 791,224, Oct. 25, 1985, Pat. No. 4,716,274. This application Feb. 16, 1990, Ser. No. 481,513

Int. Cl.[5] B23K *9/09*

U.S. Cl. 219—130.31 12 Claims



1. A pulsed welding power supply having an output with short circuit protection, comprising:

a switching device for selectively providing an output current and an output voltage to said output, said switching device being enabled to provide said output current and said output voltage when a control signal is in a first state and being disabled when said control signal is in a second state;

welding parameter selection means for providing said control signal to said switching device;

limited current source means for providing a limited current to said output when said switching device is disabled; and

voltage sensing means connected to said output and responsive to said output voltage for causing said control signal to be in said second state when said output voltage is less than a predetermined voltage.

5,073,696

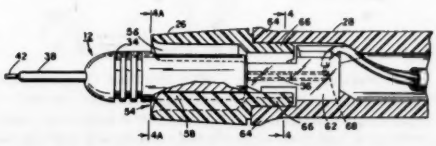
ELECTRICALLY HEATED WAX SHAPING TOOL

Ronald L. Patillo, Houston, Tex., and Charles E. Steele, Battle Creek, Mich., assignors to Kerr Manufacturing Company, Romulus, Mich.

Filed Sep. 26, 1989, Ser. No. 412,679

Int. Cl.[5] H05B *1/00, 3/00;* B23K *3/00*

U.S. Cl. 219—233 6 Claims



1. A tool suitable for shaping wax substances comprising:

a) an elongated handpiece for supporting an electrically conductive tool tip having a forward end and a rear end;

b) means in said handpiece for electrical connection to a source of electrical power;

c) the portion of said handpiece adjacent said front end having a triangular transverse cross-section for defining a gripping section;

d) said handpiece having a front end section forward of said gripping section which has an opening and means within said opening for receiving and supporting a removable a wax shaping tip in a fixed predetermined position extending forwardly from the front end of said handpiece;

e) said tip including a mounting plug section insertable into the front opening of the handpiece, and supported by said receiving and supporting means of said handpiece with said mounting plug section of the tip and the receiving and supporting means of the handpiece having interlocking means for securing the tip in a predetermined position in the handpiece; with said interlocking means further defining cooling air gaps between the outer surface of the mounting plug section and the surfaces of the receiving and supporting means; and

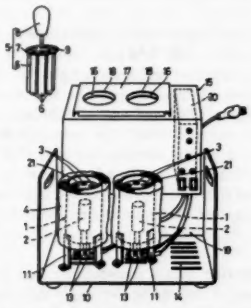
f) said tip comprising two spaced apart conductive wires carried by the mounting plug and having a rear end connected to said connection means in said handpiece when the mounting plug is mounted in the receiving and supporting means; with the front ends of the wires being joined and shaped to form a continuous tip end portion which defined configuration is capable of holding and shaping wax.

5,073,697

MULTI-USE TYPE HEATING APPARATUS

Gorō Uchiyama, 832-10, Oaza-Suna, Kawagoe-shi, Saitama-Ken, Japan

Filed Apr. 25, 1990, Ser. No. 514,306
Claims priority, application Japan, Apr. 25, 1989, 1-48359
Int. Cl.[5] F27D *11/06;* **H05B** *3/40*
U.S. Cl. 219—385 **8 Claims**



1. A heating apparatus of multi-use type comprising a thermally conductive heater body formed with a central elongate bore and further elongate bores surrounding the central bore, the further bores defining heating chambers, a heat-generating body disposed in the central bore, the heating chambers disposed at locations remote from said heat-generating body, flowable thermal conduction medium in at least one of said heating chambers, and a working mechanism for setting a heat-radiating temperature of said heat-generating body.

5,073,698

METHOD FOR SELECTIVELY HEATING A FILM ON A SUBSTRATE

Timothy J. Stultz, San Jose, Calif., assignor to Peak Systems, Inc., Fremont, Calif.

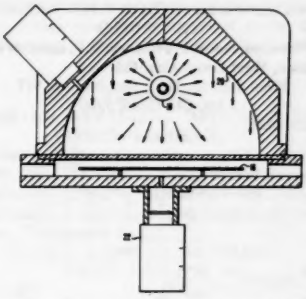
Filed Mar. 23, 1990, Ser. No. 498,670
Int. Cl.[5] F27B *5/14;* **F27D** *11/02*
U.S. Cl. 219—405 **14 Claims**

1. A method for selectively heating a film on a substrate, comprising the steps of:

selecting said film to be amorphous;

selecting said substrate and said film to have different light absorption characteristics;

illuminating said film and substrate with a source of light having a peak wavelength that will be substantially absorbed by said film and substantially not absorbed by said substrate; and



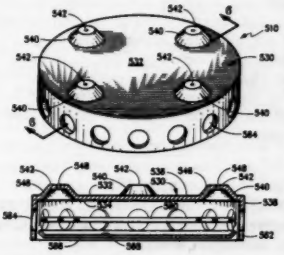
continuing to illuminate said film and substrate until said film is converted from amorphous to crystalline form.

5,073,699

DEVICE FOR WARMING FOOD AND BEVERAGE CONTAINERS HAVING SUPPORT PLATE AND PERIMETER SKIRT STRUCTURE

David W. Box, Colorado Springs, Colo., assignor to V. Dardanella Austin, Manitou Springs, Colo.

Continuation-in-part of Ser. No. 152,863, Feb. 5, 1988, Pat. No. 4,825,046. This application Apr. 24, 1989, Ser. No. 342,237
Int. Cl.[5] H05B *3/72*
U.S. Cl. 219—433 **25 Claims**



25. In a coffee maker including a coffee brewing unit for heating water to a coffee brewing temperature and conveying the water through a coffee holding filter assembly wherein the water becomes flavored by coffee and thereafter dispensing the coffee flavored water into a receiving vessel and further including a hot plate, the hot plate having a support panel for supporting the vessel, and a cyclical heating element cycling between an on state during which the element attains a maximum temperature in excess of 250° and an off state having a minimum temperature an improvement for minimizing degradation of coffee within the vessel, the improvement comprising:

said support panel is fabricated of a heat conducting material and includes an upper surface and a bottom surface opposite said upper surface the bottom surface facing said heating element, said upper surface comprises raised surface support means for supporting the vessel in spaced relation to said upper surface whereby said vessel is heated primarily by convection currents and infared radiation, said support panel includes a thermal mass operative to store heat when the heating element is in the on state of the heating cycle and discharge heat both when the ele-

ment is in the on and off states of the heating cycle thereby damping an amplitude of maximum temperatures.

5,073,700

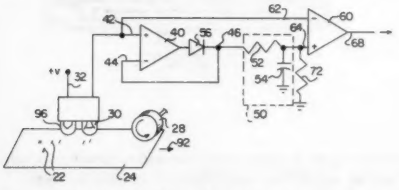
MARK SENSE DETECTOR WITH VARIABLE THRESHOLD

Enzo D. D'Onofrio, North Providence, R.I., assignor to GTECH Corporation, West Greenwich, R.I.

Filed Jan. 10, 1990, Ser. No. 462,817

Int. Cl.[5] G06K *7/00*

U.S. Cl. 235—436 **10 Claims**



1. An apparatus for discriminating reflective variations on an illuminated surface, comprising:

at least one photodetector operable to produce an input signal in response to reflections of the illuminated surface;

a first amplifier connected as a follower amplifier, the first amplifier having a non-inverting input to which said input signal is applied and an inverting input connected to sense an output of the first amplifier;

an integrator connected to sense the output of the first amplifier, the integrator including a resistor in series with the output of the first amplifier and a capacitor in parallel with the resistor;

a second amplifier connected as a comparator, the second amplifier having a non-inverting input and an inverting input, said non-inverting and inverting inputs being connected to the integrator and to the non-inverting input of the first amplifier, respectively, the integrator defining a threshold level of the comparator, an output of the second amplifier changing state in response to said input signal exceeding the threshold and the threshold being a predetermined proportion of a time-varying average of the input signal.

5,073,701

ARRANGEMENT IN A RANGE OR A COOKING HOB

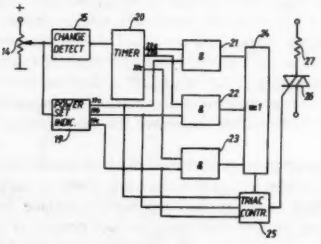
Per H. Ljunggren, Bromma, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Feb. 5, 1990, Ser. No. 475,160

Claims priority, application Sweden, Feb. 14, 1989, 8900502

Int. Cl.[5] H05B *1/02*

U.S. Cl. 219—448 **4 Claims**



1. An arrangement in a range or a cooking hob having at least one electrically heated hot plate (**11**), said arrangement comprising a manually operable setting means (**13**) for the setting of a desired power or temperature for the hot plate, characterized by a detecting means (**15**) for detecting changes in the setting of the setting means, timing means (**16**) which cooperate with the detecting means (**15**) to be activated by the latter, and a switching means (**17,26**) which cooperates with the timing means (**16,20**) to disconnect the power to the hot plate (**11**) on reaching an end time determined by the timing means, said timing means being reset each time the detecting means (**15**) is activated to start counting-up towards the predetermined end time.

5,073,702

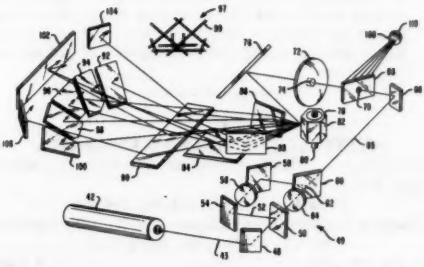
MULTIPLE BEAM BAR CODE SCANNER

Chris A. Schuhmacher, San Antonio, Tex., assignor to NCR Corporation, Dayton, Ohio

Filed Mar. 26, 1990, Ser. No. 498,887

Int. Cl.[5] G06K *7/10*

U.S. Cl. 235—467 **11 Claims**



1. An apparatus for projecting scanning light beams in a direction for scanning a coded symbol on an object comprising:

means for projecting a scanning light beam along a first path;

means mounted in said first path for splitting the scanning light beam into first and second light beams;

focusing means intercepting said first and second light beam for focusing said first and second light beams at a different focal point through which the coded symbol may pass;

first deflecting means intercepting said first focused light beam for deflecting said first light beam to a point where both of said first and second focused light beams intersect;

means mounted at said intersecting point to combine said focused light beams to form a single scanning light beam; and

second deflecting means intercepting said single scanning light beam for deflecting the single light beam in a scanning direction for scanning a coded symbol positioned at one of said focal points.

5,073,703

APPARATUS FOR ENCODING ELECTRICAL IDENTIFICATION DEVICES BY MEANS OF SELECTIVELY FUSIBLE LINKS

William H. Wehrmacher, Prior Lake, Minn., assignor to Datakey, Inc., Burnsville, Minn.

Filed Mar. 30, 1990, Ser. No. 502,177

Int. Cl.[5] G06K *19/06*

U.S. Cl. 235—492 **16 Claims**

1. In a portable electrical device for electrically accessing a master system or the like, the portable device comprising:

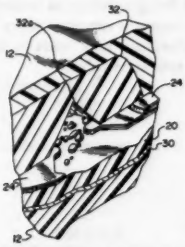
a) a conductive element adapted and arranged to operate at a first predetermined voltage level;

b) a plurality of electrical contacts each contact being connected to the conductive element via a fusible link or the like, the electrical contacts being adapted and arranged for electrical interconnection with the master system, and

c) means encapsulating the aforesaid conductive element, electrical contacts and fusible links,

whereby the portable device may be "coded" by selectively applying a fusing current to selected ones of the electrical

contacts thereby creating a predetermined pattern of first electrical contacts having a first voltage state when electrically connected to the master system and second electrical contacts having a second voltage state when electrically connected to the master system, the improvement comprising:



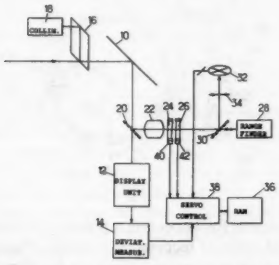
an overall construction and arrangement of the device which includes means providing a dispersal space around the fusible links for fused material whereby reformation of a fused link is prevented.

5,073,704

MULTICHANNEL OPTICAL AIMING AND SURVEYING METHOD AND APPARATUS HAVING A FIELD POSITION SPOTS CORRESPONDENCE TABLE

Serge Encaoua, Clichy, France, assignor to Societe d'Applications Generales d'Electricite et de Mecanique Sagem, Cedex, France

Filed Jun. 21, 1990, Ser. No. 541,312
Claims priority, application France, Jun. 22, 1989, 89 08333
Int. Cl.[5] G01J *1/20*
U.S. Cl. 250—201.1 **4 Claims**



2. An apparatus for optical surveying and aiming in a scene, having :

a first channel having a display unit provided with deviation measurement means;

a second channel having a sighting unit and light deviating means for angularly deviating the optical axis of the sighting unit with respect to a reference direction harmonized with the center of the vision field of the display unit;

an aiming mirror inserted in a light path common to the two channels, at a location between the portions of the two channels which are separate; and

a multichannel collimator for adjusting the angular direction of both said channels with respect to a scene being observed,

wherein the second channel further comprises means for separating a light beam from the multichannel collimator into a beam directed toward the sighting unit and a beam directed toward a zeroing detector harmonized with the sighting unit, and

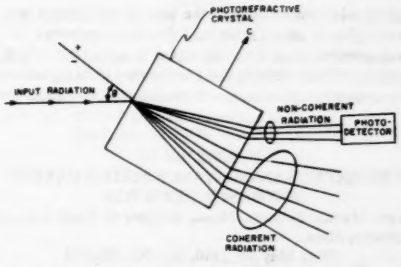
the apparatus further comprises memory means for storing a correspondence table between coordinates of spots located in the field of the display unit, as provided by the deviation measuring means, and signals to be delivered to the deviating means for aligning an axis of the sighting unit with the respective spots and electronic signal processing means for determining said correspondence from signals delivered by the deviation measuring means, by encoding means operatively associated to the deviating means and by an output signal of the zeroing detector.

5,073,705

BROADBAND, MULTI-LINE, OPTICAL POWER LIMITING SCHEME

Edward J. Sharp, Stafford Co.; Mary J. Miller, Springfield; William W. Clark, III; Gary L. Wood, both of Fairfax, all of Va., and Gregory J. Salamo, Fayetteville, Ark., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 6, 1990, Ser. No. 505,615
Int. Cl.[5] H01J *3/14*
U.S. Cl. 250—216 **1 Claim**



1. A method of protecting a sensitive photodetector from high-intensity, multiple-wavelength, coherent input radiation present in a non-coherent input radiation spectrum through the use of a photorefractive crystal, including the steps of:

cutting the photorefractive crystal such that the surfaces of incidence and exit are parallel to each other and to the direction of the largest electro-optic coefficient, normally referred to as the C axis of the crystal;

orienting said photorefractive crystal such that input radiation entering the crystal does so at an angle falling within a predetermined range as determined by the angular range of the specific crystal material selected over which enhanced beam fanning occurs for multi-wavelength coherent radiation, known as rainbow scattering, with said angle being measured between a plane perpendicular to the C axis of the crystal and the angle of incidence of the input radiation;

focusing said input radiation onto the face of said crystal whereby the angle of incidence of the input radiation within the predetermined angular rainbow scattering range of the crystal, where enhanced beam fanning occurs.

5,073,706

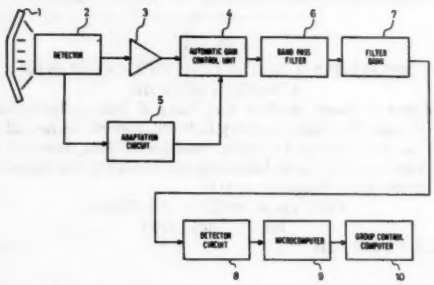
PROCEDURE AND APPARATUS FOR DETECTING OBJECTS MOVING AT VARYING SPEEDS WITHIN A CERTAIN AREA

Hannu Kulju, Hyvinkaa, Finland, assignor to Kone Elevator GmbH, Baar, Switzerland

Filed Dec. 15, 1988, Ser. No. 284,640
Claims priority, application Finland, Dec. 18, 1987, 875601
Int. Cl.[5] G01V *9/04*
U.S. Cl. 250—221 **7 Claims**

1. A procedure for detecting and counting objects having velocities and that are in a certain area, wherein background radiation caused by each object is divided into a succession of flashes which hit a surface, said procedure comprising the steps of: detecting background radiation which impinges upon said

surface with at least one passive detector and outputting a first electrical signal having a frequency that is characteristic of the velocity of each object and that changes in proportion to a change in the velocity of each object, amplifying said first signal obtained from said detector to produce a second signal



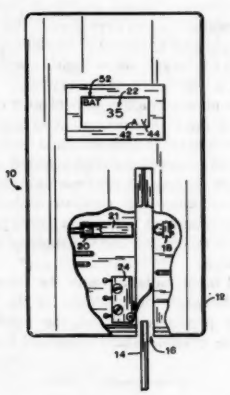
which is independent of both the size of each object and the distance of each object from said detector, analyzing the frequency content of said second signal to detect and chart the movements of said objects, and producing a third signal having a frequency content indicative of the movement of each object.

5,073,707

WINDOW-TRANSMITTANCE METER HAVING ENTRANCE DETECTOR

Edward Marcin, Scituate, Mass., assignor to Laser Labs, Inc., Scituate, Mass.

Filed May 24, 1990, Ser. No. 528,750
Int. Cl.[5] G01N 9/04
U.S. Cl. 250—223 R **5 Claims**



1. For testing the transmittance of window glass, an apparatus comprising:

A) a housing forming a receptacle adapted for insertion of a glass pane thereinto;

B) a light source for emitting light and a light detector for receiving light and generating a light-detector output indicative of the intensity of the received light, the light source and detector being so mounted in the housing with respect to each other and the receptacle that the light source shines light through a glass pane to the light detector when the pane is completely inserted into the receptacle but shines light directly to the detector when the pane is in a entrance range of positions of partial insertion;

C) a position detector for detecting the entry of a pane into a position within the entrance range and generating a presence indication in response; and

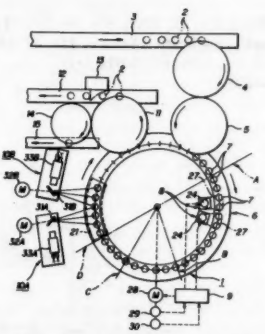
D) a comparison circuit responsive to the presence indication and the light-detector output for storing a reference value representing the value that the light-detector output assumes at a point in time determined by the time at which the position indicator initially generates the presence indication and for generating an output indicative of the ratio that the intensity represented by the light-detector output at a subsequent time bears to the intensity represented by the reference value.

5,073,708

APPARATUS FOR INSPECTING THE PRESENCE OF FOREIGN MATTERS

Kunihiro Matsumoto; Masashi Aoki; Shuji Ohnaka; Hideshi Motonaga, all of Tokyo, and Yukinobu Nishino, Ishikawa, all of Japan, assignors to Shibuya Kogyo Co., Ltd., Ishikawa, Japan

Filed Sep. 7, 1990, Ser. No. 578,779
Claims priority, application Japan, Sep. 11, 1989, 1-235986; Oct. 2, 1989, 1-257382
Int. Cl.[5] G01N 9/04
U.S. Cl. 250—223 B **7 Claims**



1. An apparatus for inspecting a presence of foreign matters including a plurality of receptacles rotatably disposed around a rotatable body for receiving vessels to be placed thereon, a rotating mechanism for driving the respective receptacles for rotation in a forward and a reverse direction, and inspecting means disposed at a given station outside the rotatable body for inspecting the vessels for the presence of any foreign matter therein as they are driven by the rotation of the receptacles, the inspecting means inspecting the vessels during an inspecting condition thereof which is reached by a reverse rotation which follows a forward rotation thereof;

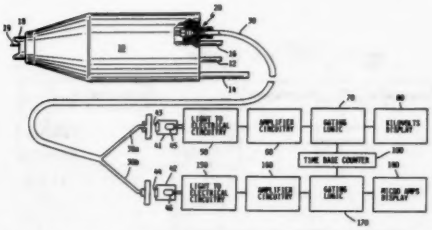
wherein the rotating mechanism comprises a control motor mounted on the rotatable body for driving the receptacle for rotation in the forward and the reverse direction, a controller for controlling the control motor, and a detector for detecting the speed of rotation of the rotatable body, the controller responding to a signal from the detector to detect any change in the speed of rotation of the rotatable body so as to control the control motor in accordance with such change, thereby allowing a given, predetermined permissible inspecting condition of the vessel to be maintained if the speed of rotation of the rotatable body changes.

5,073,709

ELECTROSTATIC SPRAY APPLICATOR WITH TWO-CHANNEL OPTICAL MONITORING SYSTEM

Lawrence J. Lunzer, St. Louis Park, Minn., and Carl D. Jacobsen, Hudson, Wis., assignors to Graco Inc., Minneapolis, Minn.

Filed Apr. 9, 1991, Ser. No. 682,681
Int. Cl.[5] G01J *3/50*
U.S. Cl. 250—226 **13 Claims**



1. An electrostatic spraying system having a self-contained electrostatic power supply in a spray applicator, with means in the applicator for developing a first electrical signal having a frequency representative of electrostatic voltage and means for developing a second electrical signal having a frequency representative of electrostatic current, comprising

a) a first light source affixed in said applicator and connected to said means for developing said first electrical signal, said first light source emitting light at a first wavelength in correspondence with said first electrical signal;

b) a second light source affixed in said applicator and connected to said means for developing said second electrical signal, said second light source emitting light at a second wavelength in correspondence with said second electrical signal;

c) a fiber optic cable having a first end affixed to said applicator, positioned to receive light from said first and second light sources; said cable having a second end split into two sections;

d) a first-wavelength bandpass filter connected to one of said two sections at the second end of said fiber optic cable, and a second-wavelength bandpass filter connected to the other of said two sections; and a photodetector cell positioned adjacent each of said bandpass filters to respectively receive light passing therethrough and to produce corresponding electrical signals; and

e) means for converting said photodetector electrical signals into respective display values identifying the magnitude of said electrostatic voltage and said electrostatic current.

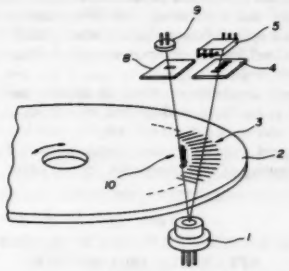
5,073,710

OPTICAL DISPLACEMENT DETECTOR INCLUDING A DISPLACEMENT MEMBER'S SURFACE HAVING A DIFFRACTIVE PATTERN AND A HOLOGRAPHIC LENS PATTERN

Masaaki Takagi; Shigekazu Nakamura, and Atsushi Omura, all of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed Sep. 19, 1990, Ser. No. 584,786
Claims priority, application Japan, Sep. 21, 1989, 1-246183; Sep. 28, 1989, 1-253287; Oct. 16, 1989, 1-268594; Oct. 16, 1989, 1-268595; Oct. 23, 1989, 1-275479; Dec. 7, 1989, 1-141206[U]
Int. Cl.[5] G01D *5/34*
U.S. Cl. 250—231.14 **19 Claims**

1. An apparatus for optically detecting displacement, comprising: light source means for emitting a coherent primary light; a displacement member undergoing a displacement transversely of the primary light to receive the primary light on its face, the displacement member having on its face a diffractive pattern effective to diffract the primary light and a holographic lens pattern effective to converge the primary light, thereby converting the primary light into a secondary light; and detection means receptive of the secondary light to detect optically the displacement of the displacement member.

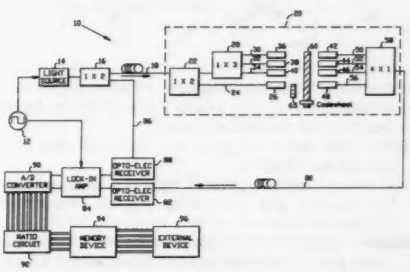


5,073,711

FIBER-OPTIC REMOTE ANGULAR POSITION SENSOR INCLUDING A POLARIZATION TRACK

Michael R. Brininstool, La Jolla, Calif.; Jeffrey T. Newmaster, Pittsburgh, Pa., and Steven L. Garrett, Carmel, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 17, 1990, Ser. No. 583,778
Int. Cl.[5] G01D *5/30*
U.S. Cl. 250—231.18 **14 Claims**



1. A sensor for remotely detecting an angular position of a shaft rotatable within a frame, comprising:

a light source for generating a primary optical beam:

first means operably coupled to receive said primary optical beam from said light source for generating collimated first, second, third, and polarized optical beams;

a code wheel fixedly mounted to said shaft, said code wheel including first, second, and third channel mask patterns, a first polarizing filter, and a reference axis, said code wheel positioned proximate to said first means so that said first, second, and third mask patterns, and said polarizing filter transect said first, second, third, and polarized optical beams, respectively, said first, second, and third channel mask patterns and said first polarizing filter being concentric with respect to a spin axis of said wheel,

said first channel mask pattern is a ring-shaped area comprising a 270 degree transparent arcuate segmented area extending +270 degrees from said reference axis, and a 90 degree opaque arcuate segmented area contiguous to said 270 degree transparent area,

said second channel mask pattern is a ring-shaped area comprising a 180 degree transparent arcuate segmented area extending +180 degrees from said reference axis, and a 180 degree opaque arcuate segmented area contiguous to said 180 degree transparent area, and

said third channel mask pattern is a ring-shaped area comprising a 90 degree transparent arcuate segmented area

extending +90 degrees from said reference axis, and a 270 degree opaque arcuate segmented area contiguous to said 90 degree transparent area;

second means positioned proximate to said code wheel for receiving and combining said first, second, third, and polarized optical beams that are transmitted through said code wheel into a composite optical beam having an intensity; and

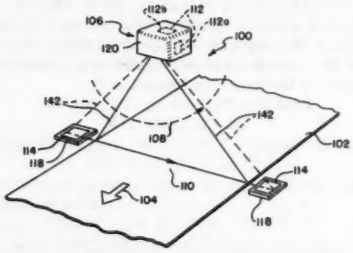
third means operably coupled to receive said composite optical beam from said second means for providing an output corresponding to said angular position of said code wheel, said angular position being functionally related to said intensity of said composite optical beam.

5,073,712

LIGHT SCANNER WEB PROFILE MEASUREMENT APPARATUS AND METHOD

Ake A. Hellstrom, Columbus, Ohio, assignor to ABB Process Automation, Inc., Columbus, Ohio

Filed Apr. 11, 1991, Ser. No. 683,844
Int. Cl.[5] G01N *21/35, 21/86*
U.S. Cl. 250—252.1 **20 Claims**



1. A system for determining light sensitive properties of a web of sheet material traveling in a first direction during its manufacture, said system comprising:

light source means for generating light including at least selected wavelengths;

light detector means for sensing light of at least said selected wavelengths and generating signals representative thereof;

scanner means for receiving light from said light source means and scanning the received light through a scanning arc which includes said web and traverses said web in a direction substantially perpendicular to said first direction;

calibration sample holder means for supporting at least two calibration samples substantially adjacent to said light scanner means and within said scanning arc;

light collector means for collecting light applied by said scanner means from said web and from said at least two calibration samples, and directing light collected therefrom onto said light detector means; and

processor means connected to said light detector means for receiving said signals and determining said light sensitive properties of said web of sheet material therefrom.

5,073,713

DETECTION METHOD FOR DISSOCIATION OF MULTIPLE-CHARGED IONS

Richard D. Smith; Harold R. Udseth, and Alan L. Rockwood, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

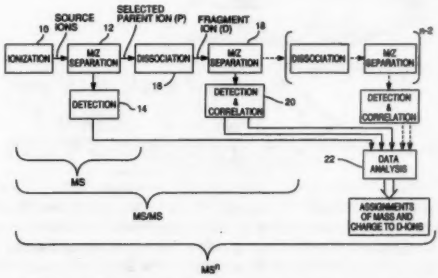
Filed May 29, 1990, Ser. No. 530,667
Int. Cl.[5] H01J *49/26*
U.S. Cl. 250—282 **43 Claims**

1. An improved charge-separation mass spectrometry method for detecting dissociation of multiple-charged ions, the method comprising:

ionizing analyte molecules to form multiple-charged parent ions, each parent ion having a known mass and a known charge;

dissociating the parent ions into sets of fragments comprising a plurality of daughter ions, each daughter ion having a mass of at least one molecular weight and a charge of at least one, including a subset of two to four sibling ions resulting from the dissociation of one of the parent ions, at least one of the sibling ions having a charge greater than one;

detecting a mass-to-charge ratio for each of the daughter ions;



detecting temporal or temporo-spatial relationships among the daughter ions;

correlating the detected daughter ions in accordance with said relationships to determined which of the detected mass-to-charge ratios belong to the subset of sibling ions; and

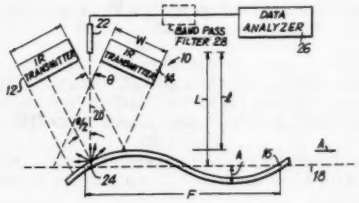
determining simultaneous values of the mass and charge of each of the sibling ions from their respective mass-to-charge ratios such that the charges determined for the sibling ions each substantially equal an integer and sum to the known charge of the parent ions.

5,073,714

METHOD AND APPARATUS FOR DETECTING AMPLITUDE AND FREQUENCY OF WEB FLUTTER USING INFRARED OPTICAL SENSOR

Dong D. Nguyen, Lawrenceville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed May 22, 1990, Ser. No. 527,216
Int. Cl.[5] G01S *17/08*
U.S. Cl. 250—341 **17 Claims**



1. A device for monitoring the flutter of a web moving along a nominal plane, said device comprising:

a. a plurality of infrared light transmitter means for generating reflected light beams from an illuminated paper web portion at all web configuration or deformation caused by flutter; and

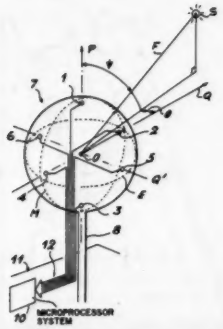
b. infrared light sensor means disposed at a preselected distance from said nominal plane for sensing infrared light scattered from said paper web, said infrared light generating an electrical signal related to the distance between said infrared light sensor means and said web.

5,073,715

ORIENTATION DETECTOR OF SOURCES EMITTING RADIOACTIVE RADIATION

René Chuiton, Clamart; Maurice Chemtob, Creteil, and Philippe Kissel, Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jul. 6, 1990, Ser. No. 549,482
Claims priority, application France, Jul. 18, 1989, 89 09627
Int. Cl.[5] G01B *15/00*; G01T *1/24*
U.S. Cl. 250—370.01 7 Claims



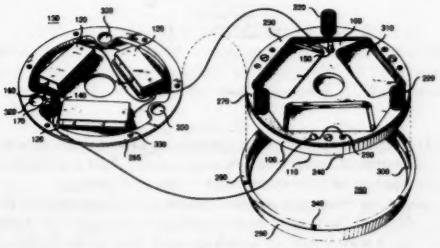
1. An orientation detector for source emitting parallel radioactive radiation; said detector comprising a homogeneous sphere formed of a material for absorbing radioactive radiation in proportion to the length of the path traversed by such radiation in said homogeneous material; six radiation sensors arranged in pairs on three different diameters of said sphere and sensitive to radioactive radiation received in accordance with characteristics independent of the direction of the source of such radiation, and means associated with said sensors for measuring and comparing the radioactive radiation received by said sensors and for calculating the azimuth angle and the site angle of a radiation source relative to said detector.

5,073,716

APPARATUS COMPRISING AN ELECTROSTATIC WAFER CASSETTE

James T. Clemens, Watchung, and Shane Y. Hong, Berkeley Heights, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 521,765, May 10, 1990, Pat. No. 4,999,507.
This application Dec. 12, 1990, Ser. No. 626,930
The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.
Int. Cl.[5] H01V *37/20*
U.S. Cl. 250—492.2 4 Claims



1. A method for manufacturing an article, comprising the steps of: providing a semiconductor wafer having first and second major surfaces and a processing layer overlying at least a portion of the first surface; providing means for securing the wafer, the securing means including a charge plate; electrostatically flattening the wafer against the charge plate; exposing the processing layer to actinic radiation; and performing at least one additional step toward completion of the article,

CHARACTERIZED IN THAT

the securing means further comprise means for storing an electrical charge, the charge storage means being adapted to maintain an electrical potential difference, without connection to a source of electrical energy external to the securing means, for a period of time that is longer than an average exposure time associated with said exposing step; and

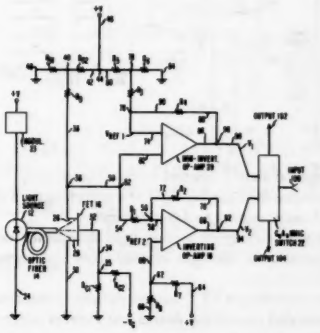
the flattening step comprises the steps of creating an electrical potential difference between the wafer and the charge plate, and maintaining the potential difference by means of the charge storage means.

5,073,717

OPTICAL CONTROL OF A MICROWAVE SWITCH

Dana J. Sturzebecher, Tinton Falls, and Arthur Paolella, Howell, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 15, 1990, Ser. No. 604,082
Int. Cl.[5] G02B *27/00*
U.S. Cl. 250—551 5 Claims



1. An optical controlled switch circuit comprising:

a light source for emitting light at a wavelength in the region of 0.5 micrometers to 1.0 micrometer;

control means coupled to said light source for controlling the intensity of the light emitted from said source;

a fixed resistance;

a GaAs multi-finger FET having parallel connected sources and parallel connected drains and parallel connected gate fingers;

circuit means for connecting the sources and drains of said FET in series circuit with said fixed resistance across a source of positive dc voltage;

means optically coupled from said light source on the surface of said FET between the sources and drains of the FET and covering substantially all of the gate fingers of the FET;

gate biasing means coupled to the gates of said FET for biasing said FET to a point near pinch-off to maximize the light sensitivity of the FET;

inverting dc amplifier means having an input coupled to a circuit junction of said fixed resistance and said FET and having an output and having another input for receiving a reference voltage;

non-inverting dc amplifier means having an input coupled to said circuit junction of said fixed resistance and said FET and having an output and having another input for receiving a reference voltage;

a two-way voltage driven microwave unit having an input coupled to the output of the inverting dc amplifier means and another input coupled to the output of the non-invert-

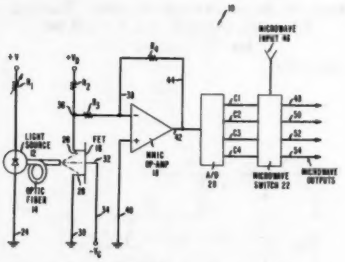
ing dc amplifier means and having a microwave input and having a first microwave output and having a second microwave output, whereby changes in the intensity of light from said light source change the voltage drop across said FET and change the signals applied to said inverting dc amplifier means and to said non-inverting dc amplifier means and change the signals applied to said microwave unit to thereby route its microwave input to one or the other of its microwave outputs.

5,073,718

OPTICAL CONTROL OF A MICROWAVE SWITCH

Arthur Paolella, Howell, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 15, 1990, Ser. No. 604,081
Int. Cl.[5] G02B *27/00*
U.S. Cl. 250—551 **5 Claims**



1. An optical switch control circuit comprising:

a light source for emitting light at a wavelength in the region of 0.5 micrometers to 1.0 micrometer;

control means coupled to said light source for controlling the intensity of the light emitted from said source;

a fixed resistance;

a GaAs multi-finger FET having parallel connected sources and parallel connected drains and parallel connected gate fingers;

circuit means for connecting the sources and drains of said FET in series circuit with said fixed resistance across a source of positive, dc voltage;

means optically coupled from said light source on the surface of said FET between the sources and drains of the FET and covering substantially all of the gate fingers of the FET;

gate biasing means coupled to the gates of said FET for biasing said FET to a point near pinch-off to maximize the light sensitivity of the FET;

dc amplifier means having an input coupled to a circuit junction of said fixed resistance and said FET and having an output;

an analog to digital converter coupled at its input to the output of said dc amplifier means and having a plurality of outputs; and

a multi-bit microwave switch having a plurality of inputs respectively coupled through respective control lines to the outputs of the analog to digital converter and having a microwave input and having a plurality of microwave outputs;

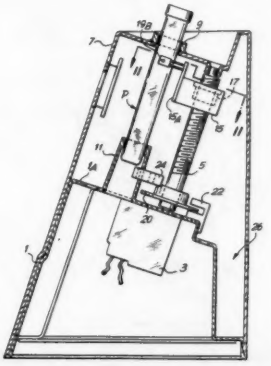
whereby changes in the intensity of light from said light source change the voltage drop across said FET and change the signal applied to said dc amplifier means and then change the signal applied to said analog to digital converter and then change the multi-bit word signal applied to said microwave switch to thereby change the microwave input routed to the microwave outputs in a selective fashion.

5,073,719

APPARATUS FOR THE EVALUATION OF THE ERYTHROSEDIMENTATION RATE AND OTHER

Antonio Ricci, Monteriggioni, Italy, assignor to Diesse Diagnostica Senese S.r.l., Milan, Italy

Filed Sep. 14, 1990, Ser. No. 583,800
Claims priority, application Italy, Sep. 26, 1989, 11708/89[U]
Int. Cl.[5] G01N *15/06*
U.S. Cl. 250—573 **5 Claims**



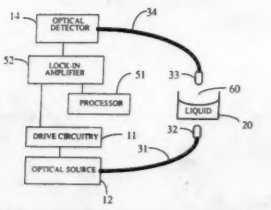
1. An apparatus for measuring the erythrosedimentation rate and carrying out other similar analyses through photometric reading, comprising: one or more seats (**9**, **11**) for receiving test tubes (P) inclined to a limited extent with respect to the vertical; guide means (**13**) for a skid (**15**) able to slide parallel to the test tube(s) (P) introduced into said seat(s) for the reading; on said skid (**15**), emitting and receiving members (**19A**, **19B**) for a signal of optical type which goes through the or each test tube (P) during the reading scan; and a motorization (**3**, **5**) for the displacements of said skid (**15**).

5,073,720

LIQUID LEVEL AND VOLUME MEASUREMENT DEVICE

Gair D. Brown, Dahlgren, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 30, 1990, Ser. No. 561,413
Int. Cl.[5] G01N *15/06*
U.S. Cl. 250—577 **13 Claims**



1. A liquid level and volume measuring device for measuring a continuum of liquid levels or volumes of a fluid contained in a transparent or semi-transparent vessel comprising:

means for emitting a constant power light beam through the depth of the fluid to be measured, wherein said light beam has a wavelength to match spectral absorptive characteristics of the fluid;

means for detecting said light beam exiting the fluid;

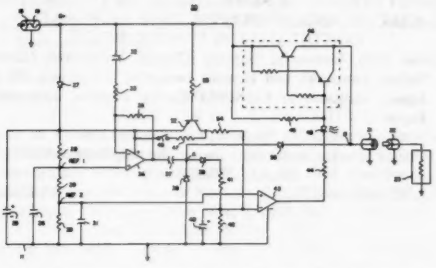
means for calculating a continuum of fluid levels or volume levels in the fluid under test from the attenuation of said light beam by the fluid.

5,073,721

NOISE IMMUNE POWER SWITCH FOR AUTOMOTIVE ACCESSORIES

Lawrence Terrill, Bloomington, and Francis L. Carr, Downers Grove, both of Ill., assignors to Safco Corporation, Chicago, Ill.

Filed Apr. 23, 1990, Ser. No. 512,974
Int. Cl.[5] H02H *7/18*
U.S. Cl. 307—10.7 **6 Claims**



1. A noise immune electronic switch for powering a utilization device from the cigarette lighter socket of an automotive vehicle having a storage battery, a starter motor and an engine driven alternator system that, during operation, develops an AC ripple voltage having a frequency within a limited frequency range at said lighter socket, comprising:

an input connector adapted to mechanically and electrically engage said lighter socket;

an output connector adapted for electrical connection to an accessory device;

filter means coupled to said input connector for passing signals within said limited frequency range;

amplifying means coupled to said filter means for amplifying said signals;

switch means connected between said input connector and said output connector;

integration means for driving said switch means conductive responsive to a predetermined output from said amplifying means;

defeat means for nullifying said integration means when an accessory is connected to said output connector; and

turn-on means responsive to a particular signal at said lighter socket for overriding said defeat means to enable said switch means.

5,073,722

APPARATUS AND METHOD FOR CLEANING A HEADLAMP AND ACTUATING A WINDSHIELD WIPER

Kazuyoshi Tohge, and Junichiro Takeshita, both of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K., Yokohama, Japan

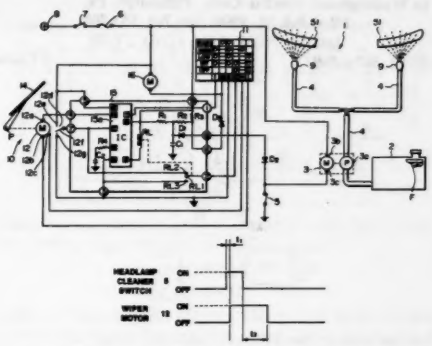
Filed Apr. 23, 1990, Ser. No. 513,522
Claims priority, application Japan, Apr. 24, 1989, 1-47834[U]
Int. Cl.[5] H02J *1/00*
U.S. Cl. 307—10.1 **3 Claims**

1. A headlamp cleaner for washing a headlamp by spraying detergent liquid stored in a reservoir against a headlamp lens through a jet which comprises:

a washer motor for driving a washer pump to feed the detergent liquid;

a headlamp cleaner switch for supplying electric power to said washer motor; and

a control means provided with a first timer means for actuating a wiper motor of a windshield wiper apparatus in



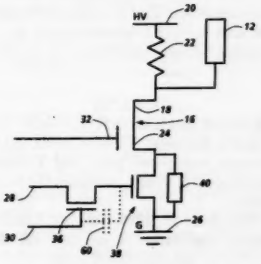
response to ON-operation of said headlamp cleaner switch, after a predetermined time interval elapses.

5,073,723

SPACE CHARGE CURRENT LIMITED SHUNT IN A CASCODE CIRCUIT FOR HVTFT DEVICES

Victor M. Da Costa, San Carlos, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 10, 1990, Ser. No. 565,767
Int. Cl.[5] H03K *17/84, 19/12*
U.S. Cl. 307—298 **10 Claims**



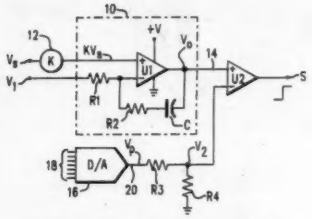
1. In a cascode circuit comprising a high voltage thin film transistor and a low voltage thin film transistor connected in series with said high voltage thin film transistor, each of said transistors including a source electrode a drain electrode and a gate electrode, said drain electrode of said high voltage transistor being connected to a source of high potential, said gate electrode of said high voltage transistor being connected to a source of fixed potential, said source electrode of said high voltage transistor being connected to said drain of said low voltage transistor and said source electrode of said low voltage transistor being connected to a source of reference potential, the improvement for switching said high voltage thin film transistor substantially over its entire high voltage range comprising a thin film space charge limited current shunt connected in parallel with said low voltage transistor between said source electrode and said drain electrode of said low voltage transistor.

5,073,724

PROGRAMMABLE INVERSE TIME DELAY CIRCUIT

David A. Fox, Shawnee Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 18, 1990, Ser. No. 553,508
Int. Cl.[5] H03K *5/24, 17/08, 17/28*
U.S. Cl. 307—360 4 Claims



1. An inverse time delay circuit comprising:

an integrator having a first input for receiving a signal representative of a voltage or current signal in an external circuit and having a second input for receiving a first reference signal, said integrator producing a control signal representative of the integral of the difference of the signals at said first and second inputs;

a comparator having a first input connected to receive said control signal and having a second input connected to receive a second reference signal, said comparator producing an output signal which changes logic states when the magnitude of said control signal exceeds the magnitude of said second reference signal; and

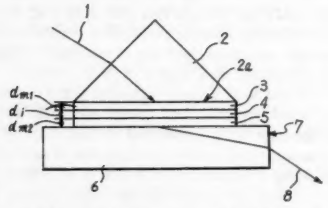
means for programming said magnitude of said second reference signal in response to a command signal, wherein said means for programming the magnitude of said second reference signal includes: a digital-to-analog converter for receiving said command signal and for producing a first programmed reference voltage; and a first voltage divider including first and second resistors electrically connected in series with each other, said first resistor being connected to receive said first programmed reference voltage such that said second reference signal is produced at a junction point between said first and second resistors.

5,073,725

OPTICAL HARMONIC GENERATOR

Toshihiko Takano, Kashiwa; Yoshio Okada, Kawagoe; Yoshio Inoue, Matsudo; Kouzaburo Yano, and Terutaka Tokumaru, both of Kashiwa, all of Japan, assignors to Sharp Corporation, Tokyo, Japan

Filed Dec. 11, 1990, Ser. No. 625,355
Claims priority, application Japan, Dec. 15, 1989, 1-326869
Int. Cl.[5] H03F *7/00*
U.S. Cl. 307—427 7 Claims



1. An optical harmonic generator comprising:

an optical component for converting incident light into an evanescent wave;

a multi-layered film having a thin dielectric film disposed between thin metal films, for exciting a metal surface plasmon by the evanescent wave emitted from the optical component; and

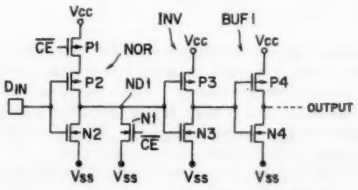
a nonlinear optical crystal for generating light having a frequency which is N times (N is an integer larger than 1) the frequency of the incident light by an electric field produced by the metal surface plasmon excited in the multi-layered film.

5,073,726

INPUT CIRCUIT OF SEMICONDUCTOR INTEGRATED CIRCUIT AND SEMICONDUCTOR INTEGRATED CIRCUIT HAVING INPUT CIRCUIT

Hideo Kato, Kawasaki; Shinichi Kikuchi, Yokohama; Hiroto Nakai, Kawasaki, and Hiroshi Iwahashi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 30, 1990, Ser. No. 559,139
Claims priority, application Japan, Jul. 28, 1989, 1-195951
Int. Cl.[5] H03K *19/017*
U.S. Cl. 307—443 11 Claims



1. In a semiconductor integrated circuit comprising, as a portion of an input circuit, a first drive MOS transistor of the N-channel type of which a gate electrode is connected to an external signal input terminal,

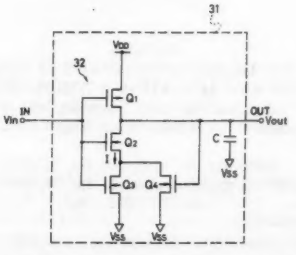
the improvement comprises that a threshold voltage of said first drive MOS transistor is set to a value lower than a threshold voltage of a second drive MOS transistor of the N-channel type constituting each of other internal circuits of said integrated circuit.

5,073,727

CMOS INVERTER WITH NOISE REDUCTION FEEDBACK MEANS

Harumi Shizu, 1-130-1-102, Mizuhodori, Kasugai-shi, Aichi, 486, Japan

Filed May 25, 1989, Ser. No. 356,920
Claims priority, application Japan, Jun. 17, 1988, 63-150848
Int. Cl.[5] H03K *19/094*
U.S. Cl. 307—451 10 Claims



1. A semiconductor integrated circuit comprising:

a first MOS transistor coupled between a first power supply line and an output node of the semiconductor integrated circuit, said first MOS transistor having a first channel type;

a second MOS transistor coupled between the output node

and a first intermediate node, said second MOS transistor having a second channel type;

a third MOS transistor coupled between the first intermediate node and a second power supply line, said third MOS transistor having the second channel type; and

a fourth MOS transistor coupled between the first intermediate node and the second power supply line, said fourth MOS transistor having the second channel type, wherein

gate electrodes of said first, second and third MOS transistors being commonly coupled to an input node of the semiconductor integrated circuit, and

a gate electrode of said fourth MOS transistor being coupled to the output node.

5,073,728

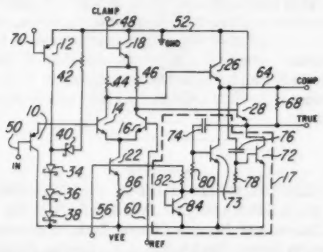
ACTIVE LOAD FOR ECL TYPE OUTPUTS

Kevin M. Ovens, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 302,063, Jan. 24, 1989, abandoned, which is a continuation of Ser. No. 73,665, Jul. 15, 1987, abandoned. This application Nov. 5, 1990, Ser. No. 609,037

Int. Cl.[5] H03K *19/086, 5/153*

U.S. Cl. 307—455 **14 Claims**



1. An active load circuit for a logic output circuit, which has a true output, a complementary output, and external reference line and a reference supply voltage line, said active load circuit comprising:

a first transistor having a collector connected to said true output, an emitter connected to said reference supply voltage line, and a base;

a second transistor having a collector connected to said complementary output, an emitter connected to said reference supply voltage line, and a base;

a bias circuit having an output coupled to said bases of said first and second transistors and said external reference line and having an input connected to said reference supply voltage line, said bias circuit supplying bias current to said first and second transistors;

a first charge coupling element connected between and for coupling charge between said base of said first transistor and said complementary output lead; and

a second charge coupling element connected between and for coupling charge between said base of said second transistor and said true output lead.

5,073,729

SEGMENTED ROUTING ARCHITECTURE

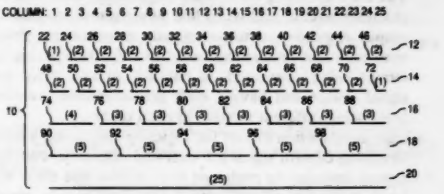
Johathan W. Greene; Abbas A. El Gamal, both of Palo Alto, and Sinan Kaptanoglu, San Carlos, all of Calif., assignors to Actel Corporation, Sunnyvale, Calif.

Filed Jun. 22, 1990, Ser. No. 542,722

Int. Cl.[5] H03K *19/177*

U.S. Cl. 307—465.1 **16 Claims**

1. A user-configurable interconnect architecture employable in user-configurable integrated circuits having individual wiring segments organized into wiring tracks and a plurality of said wiring tracks organized into a wiring channel, the lengths of said wiring tracks being measurable in column units where the unit length of a column is equal to the largest common divisor of the lengths of said wiring segments, wherein the lengths of the wiring segments in an individual wiring ,track



are balanced such that the ratio of the lengths of adjacent ones of said wiring segments does not exceed about 2.

5,073,730

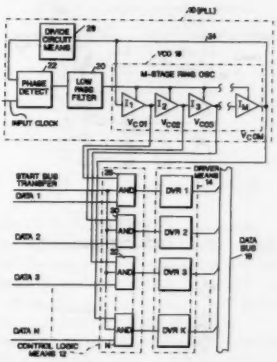
CURRENT TRANSIENT REDUCTION FOR VLSI CHIPS

Charles R. Hoffman, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1990, Ser. No. 513,530

Int. Cl.[5] H03K *5/20*

U.S. Cl. 307—480 **9 Claims**



2. A VLSI chip comprising:

a bus for transmitting data;

a plurality of driver modules, each one having an output node coupled to said bus; and

a controller means including a phase lock loop coupled to the driver modules, said controller means sequencing the switching of the driver modules in a controlled manner so that output signals from said driver modules are spread over a time interval which is relatively short when compared to the bus transfer cycle.

5,073,731

BOOTSTRAPPING LEVEL CONTROL CIRCUIT FOR WORD LINE SIGNAL PRODUCING CIRCUIT IN A DRAM

Jong H. Oh, Kyungki-Do, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyungki, Rep. of Korea

Filed Sep. 21, 1990, Ser. No. 586,000

Claims priority, application Rep. of Korea, Sep. 23, 1989, 89.13708

Int. Cl.[5] H03K *19/12, 19/096*

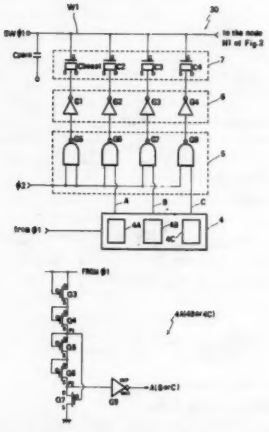
U.S. Cl. 307—482 **12 Claims**

1. A bootstrapping level control circuit for a word line signal producing circuit in a DRAM for completely supplying the potential of a word line signal source, through a word line signal transferring control circuit, to a memory cell array apparatus, when said word line signal transferring control

circuit is enabled, said bootstrapping level control circuit comprises:

a Vcc level detector provided with a first, second and third Vcc level detecting circuits for respectively detecting the potential level at said word line signal source, to thereby output respective detected signals detected therefrom, with each said first, second and third Vcc level detecting circuit being connected, in parallel, to said word line signal source and having each predetermined inverting level being different relative to each other;

a logic combination circuit for logically combining a bootstrapping control signal $\phi 2$ with said respective detected signals detected by each said first, second and third Vcc level detecting circuit, said logic combination circuit including a NAND gate (G5) having two inputs connected to each other to receive said bootstrapping control signal $\phi 2$, and NAND gates (G6), (G7), and (G8) with one input of each said NAND gate (G6), (G7) and (G8) to receive said bootstrapping control signal $\phi 2$ and a remaining input of each said NAND gate (G6), (G7) and (G8) connected to each said first, second and third Vcc level detecting circuit, respectively, for receiving said respective detected signals of each said first, second and third Vcc level detecting circuit of said Vcc level detector,



thereby outputting logically combined signals, respectively;

an inverting circuit for delaying each said logically combined signals outputted from each said NAND gate (G5), (G6), (G7) and (G8) of the logic combination circuit, said inverting circuit including a plurality of NOT gates (G1), (G2), (G3) and (G4), respectively, connected to each said NAND gate (G5), (G6), (G7) and (G8) for inverting each said logically combined signals from said logic combination circuit, to thereby output an inverted signal for each said logically combined signal, respectively; and,

a bootstrapping circuit including a bootstrapping capacitor, MOSFET capacitors (C2), (C3) and (C4), respectively, connected, in parallel, to a bootstrapping point, node (N1), for bootstrapping said bootstrapping point, node (N1), depending upon each said inverted signal, respectively, received from each said NOT gates (G1), (G2), (G3) and (G4) of the inverting circuit, thereby varying the bootstrapping efficiency of said bootstrapping level control circuit depending upon the potential level at said word line signal source detected by each said first, second and third Vcc level detecting circuit to prevent double bootstrapping effects from being occurred in said word line transferring control circuit.

5,073,732

LIMITER CIRCUIT FOR ALTERNATING VOLTAGES

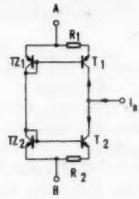
Gerhard-Jürgen Bockelmann, Jersbek, Fed. Rep. of Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Oct. 23, 1990, Ser. No. 603,975

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1989, 3935844

Int. Cl.[5] H03H *11/52*

U.S. Cl. 307—540 **15 Claims**



1. A limiter circuit for alternating voltages, the circuit comprising a series arrangement of two diode groups, the groups being arranged in opposite sense and each group comprising at least one zener diode, characterized in that one zener diode of each comprises a diode-connected first transistor, which together with a respective further transistor forms a respective current mirror whereby a reproduced value of the limiter current flows through the further transistors to form a limiter signal current (I_s) which indicates the flow of a limit current in a zener diode.

5,073,733

DELAY CIRCUIT WITH MUTING TO PREVENT NOISE DUE TO RANDOM DATA AT OUTPUT

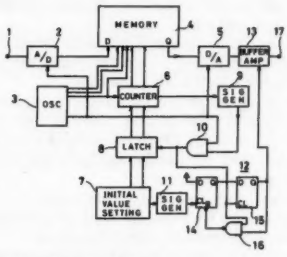
Masaya Tanno, and Masato Onaya, both of Gunma, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Apr. 18, 1990, Ser. No. 510,702

Claims priority, application Japan, Apr. 20, 1989, 1-100775

Int. Cl.[5] H03K *5/159, 3/01, 21/00*

U.S. Cl. 307—590 **5 Claims**



1. A delay circuit, comprising:

an analog to digital (A/D) converting circuit for A/D converting an input signal;

a memory for storing a digital signal outputted from said A/D converting circuit;

a digital to analog (D/A) converting circuit for D/A converting a digital signal outputted from said memory;

a counter for designating addresses to be used in said memory;

an initial value setting circuit for initially setting an initial value of said counter;

a first signal generating circuit for detecting that an end value of said counter is reached and for generating a control signal;

a second signal generating circuit for generating a setting completion signal when an initial value setting operation by said initial value setting circuit is completed; and

a muting signal generating circuit for generating a muting

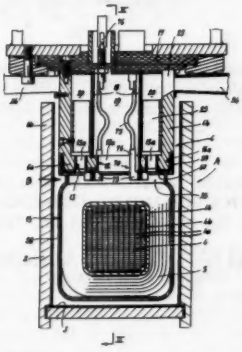
signal in response to said setting completion signal and said control signal.

5,073,734

COOLING DEVICE FOR A LINEAR MOTOR INDUCTOR

Marc Combette, La Fouillouse, France, assignor to Constructions Electriques du Centre CELDUC Societe Anonyme, Sorbiers, France

Filed Oct. 29, 1990, Ser. No. 604,229
Claims priority, application France, Oct. 30, 1989, 89 14620
Int. Cl.[5] H02K *41/00*
U.S. Cl. 310—65 10 Claims



1. A cooling device for a linear motor inductor having a prismatic axial core with a plurality of coils surrounding said prismatic axial core, each coil comprising two coil disks and each coil disk having a first face and a second face of a substantially square configuration defining four surface edges for the coil, the cooling device comprising:

a U-shaped support constituting a magnetic screen offset from the plurality of coils, a cross-member of said U-shaped support defining a web from which two wings extend in a direction away from the plurality of coils, said web having a plurality of openings therein;

a joining piece mounted on said wings to define a cavity equipped with inlet and outlet openings for flow of a cooling fluid, said cavity being divided by at least one partition into a central inlet chamber and at least one lateral outlet chamber;

components forming radiators mounted on a surface of said wing facing into said at least one lateral outlet chamber;

magnetic islets associated with each face of each coil disk;

a spacer positioned between said magnetic islet associated with the first face of one coil disk and said magnetic islet associated with the second face of an adjacent coil disk, said spacer between said magnetic islets forming an annular cooling channel, said spacers being made of a molded synthetic material and further comprising an interior wall and an exterior wall that together with said associated magnetic islets form said annular cooling channel with a C-shape; a mouth formed in said exterior wall at each end of said C-shaped annular cooling channel for communicating with said openings in said web; and a groove between said mouths at each end of said C-shaped annular cooling channel;

at least one longitudinal bar of a synthetic material having a base received in said groove between said mouths of said spacer;

an insulating cover covering said web of said U-shaped support on a side toward the axial core, said insulating cover on a side adjacent said web having wells extending into said openings and on a side toward the axial core having at least one groove for receiving a vertex of said longitudinal bar;

shield means of a synthetic material at each end of each coil;

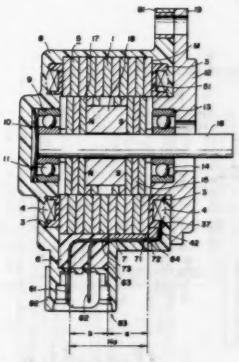
an intermediate chamber formed between said insulating cover and said plurality of coils, wherein said longitudinal bar is equipped with positioning means at each end and said shield means have complementary means for receiving said positioning means, said longitudinal bar forming a partition in said intermediate chamber.

5,073,735

STEPPING MOTOR HAVING A MOLDED HOUSING

Kunio Takagi, Aichi, Japan, assignor to Aisan Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 11, 1991, Ser. No. 728,656
Claims priority, application Japan, Jul. 16, 1990, 2-75458[U]
Int. Cl.[5] H02K *37/04, 5/22, 5/26*
U.S. Cl. 310—71 5 Claims



1. A stepping motor including:

a stator core which is a laminate of thin steel plates, said stator core having a cylindrical outer peripheral surface and an inner peripheral surface on which are formed a plurality of axially extending ridges and grooves formed alternately in a circumferential direction;

bobbins formed of an insulating material and held in abutment with at least both axial end faces of said stator core;

stator coils wound round said ridges from above-said bobbins,

a first support member formed of an insulating material and fixed to a part of the outer peripheral surface of said stator core, said first support member having an engaging surface for abutment with a first end face out of both axial end faces of the stator core;

a second support member formed of an insulating material and fixed to a part of the outer peripheral surface of said stator core between an end portion of said first support member and a second end face out of both axial end faces of the stator core;

a plurality of terminal plates each having a central portion fixed in the interior of said second support member, a first end portion and a second end portion, said first end portion being projected in a radial direction of said stator core, said second end portion being projected axially of the stator core from the outer surface of the second support member and extending along an outer surface of said first support member, with end portions of electric wires which constitute said stator coils being connected to said second end portions of the terminal plates;

a housing formed by molding of a synthetic resin, said housing covering said outer peripheral surface of said stator core, the outer surface of said first and second support members, further covering said bobbins and stator coils projecting from both axial end faces of the stator core; and

a male connector comprising said first end portions of said

terminal plates extending in the radial direction of said stator core from said second support member and being made projected through said housing to an outer peripheral surface of the housing and a socket wall formed integrally with said housing in surrounding relation to said first end portions.

5,073,736

BRUSHLESS PUMP MOTOR WITH BUILT-IN ELECTRONIC CONTROL

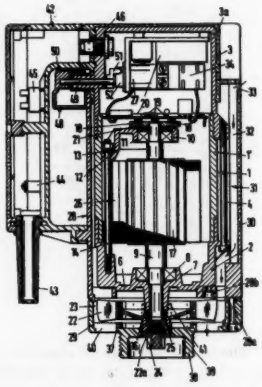
Alois Gschwender, Neubulach; Detlef Walther, Stuttgart; Horst Krüger, Sulzfeld, and Rüdiger Pawlischta, Ersingen, all of Fed. Rep. of Germany, assignors to Flux- Geräte GmbH, Maulbronn, Fed. Rep. of Germany

Filed Jul. 7, 1989, Ser. No. 376,759

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3825035

Int. Cl.[5] H02K *5/00, 9/06*

U.S. Cl. 310—88 **19 Claims**



1. In a motor for a pump including: a housing in which a rotor, via its rotor shaft, is rotatably mounted; a stator disposed in said housing and surrounding said rotor; and a power supply line that is connected to a switch or control device, the improvement wherein:

said motor is an electronically connected direct current motor that has no brushes;

said switch or control device is an electronic switch or control device that is accommodated in said housing;

said direct current motor is provided with means to recognize the position of said rotor;

said recognition means includes at least one magnet ring that is fixedly connected to said rotor shaft, and sensors, that are associated with said magnet ring; and

said magnet ring is part of a carrier member that is embodied as an auxiliary fan means and is fixedly seated on said rotor shaft.

5,073,737

MAGNETIC BEARING DEVICE

Akira Yamamura, Tokyo, Japan, assignor to Nippon Ferrofluidics Corporation, Tokyo, Japan

Continuation of Ser. No. 418,316, Oct. 6, 1989, abandoned. This application Jul. 27, 1990, Ser. No. 560,460

Claims priority, application Japan, Oct. 7, 1988, 63-254621

Int. Cl.[5] H02K *7/09*

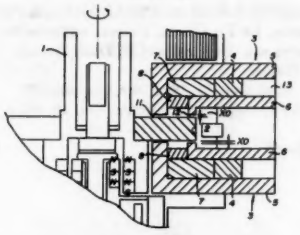
U.S. Cl. 310—90.5 **2 Claims**

1. A magnetic bearing device comprising:

a rotary main shaft;

an armature disk mounted on said rotary main shaft; and

a pair of bearing elements disposed on opposite sides along an axial direction of said armature disk, each of said bearing elements including a control coil provided with a pair of pole pieces, a top end of each of said pole pieces being disposed near said armature disk, and said pole pieces



being provided with a sensor coil at a position nearer to a front end side of said control coil whereby the sensor coil has a magnetic path common with the control coil.

5,073,738

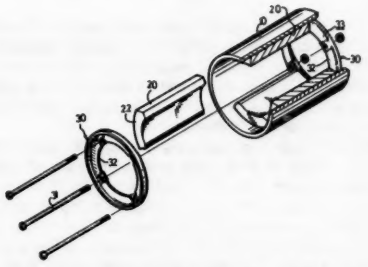
DIRECT CURRENT MOTOR HAVING A RETAINING DEVICE FOR HOLDING MAGNETS

Yeong Y. Tang, No. 142, Chung Shan Rd., Feng Yuan City, Taiwan

Filed Dec. 27, 1990, Ser. No. 634,897

Int. Cl.[5] H02K *5/00*

U.S. Cl. 310—91 **1 Claim**



1. A direct current motor comprising a housing which is cylindrically shaped, at least two magnets being received within said housing and contacting an inner surface of said housing, a pair of rings being force-fitted within end portions of said housing and being coupled together by bolts, each of said rings having an annular flange extended inward therefrom, said magnets being retained and coupled between said annular flanges of said rings, each of said annular flanges having at least two recesses formed in an inner surface thereof, each of said recesses having a shape similar to that of an end portion of each of said magnets so that said end portions of said magnets can be engaged within said recesses respectively and so that said magnets can be stably retained in place by said rings without any adhesive material.

5,073,739

VIBRATION-COUPLING TYPE ULTRASONIC ACTUATOR AND METHOD FOR OPERATING THE SAME

Tamotsu Iijima, Kofu, and Kazuhide Sano, Yamanashi, Japan, assignors to Nisca Corporation, Yamanashi, Japan

Filed Feb. 27, 1991, Ser. No. 661,195

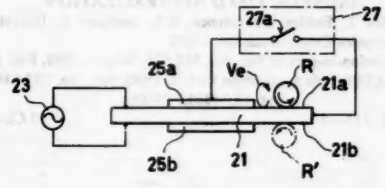
Claims priority, application Japan, Feb. 27, 1990, 2-46606

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—323 **18 Claims**

1. A vibration-coupling type ultrasonic actuator comprising an elastic vibrational member having a shape in which longitu-

dinal and bending vibrations are induced concurrently with resonance frequency of single phase, an exciting means formed on said vibrational member for exciting said vibrational member so as to produce said vibrations in said vibrational member, at least one piezoelectric member disposed on said vibrational member about one or more common nodes of vibrations ex-



cited inside said vibrational member, and at least one resonance controlling means being in electrical connection with said vibrational member and at least one piezoelectric member so as to discharge an electric charge generated in said piezoelectric member by said longitudinal and bending vibrations to thereby cause said vibrations to be coupled.

5,073,740

LAMINATE-TYPE DISPLACEMENT ELEMENT

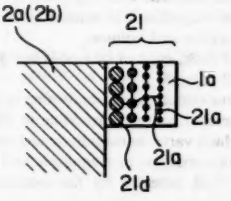
Shigeru Jomura, Tokyo, and Junichi Watanabe, Saitama, both of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Continuation of Ser. No. 248,520, Sep. 23, 1988, abandoned. This application Jul. 18, 1990, Ser. No. 555,668

Claims priority, application Japan, Sep. 25, 1987, 62-240503; Jul. 26, 1988, 63-186146

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—358 **10 Claims**



2. A laminate type displacement element comprising:

a plurality of plates of an electrochemical conversion material, each said plate including opposite first and second surfaces and opposite first and second sides, said first surface being laminated with an internal electrode material extending from said first side to cover a portion of said first surface, said second surface being laminated with an internal electrode material extending from said second side to cover a portion of said second surface, defining a portion of said plate where said internal electrode material disposed on each surface overlaps, said plurality of plates being stacked together with said first and second surfaces of adjoining plates opposing one another to form a stack having opposite first and second side portions and defining a deflecting portion internal to said stack corresponding to said overlapping portions of said plurality of plates having a predetermined deflection amount;

a first external electrode laminated to said first side portion of said stack, electrically contacting said internal electrodes on said first surfaces of said plurality of plates and defining a first non-deflecting portion at said first side portion of said stack having zero deflection;

a second external electrode laminated to said second side portion of said stack electrically contacting said internal electrodes on said second surfaces of said plurality of plates and defining a second non-deflecting portion at said second side portion of said stack having zero deflection;

a first buffer zone disposed between said deflecting portion internal to said stack and said first non-deflecting portion at said first side portion of said stack, said first buffer zone having a deflection amount increasing from zero at said first non-deflecting portion to said predetermined deflection amount at said deflecting portion; and

a second buffer zone disposed between said deflecting portion internal to said stack and said second non-deflecting portion at said second side portion of said stack, said second buffer zone having a deflection amount increasing from zero at said second non-deflecting portion to said predetermined deflection amount at said deflecting portion.

5,073,741

IGNITER PLUG

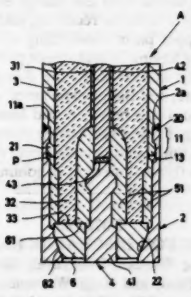
Takahiro Suzuki, and Noboru Aoki, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Dec. 28, 1990, Ser. No. 635,730

Claims priority, application Japan, Dec. 29, 1989, 1-343693

Int. Cl.[5] H01T *13/02*

U.S. Cl. 313—138 **3 Claims**



1. In an igniter plug comprising a tubular metallic shell and an annular ground electrode each connected in series by an interfitting, and fixed by means of welding or brazing, the igniter plug further having a tubular insulator concentrically placed within both the metallic shell and the ground electrode, while a center electrode is concentrically placed within the insulator to be surrounded by the ground electrode;

the improvement comprising;

a plurality of lock arms circumferentially provided with either of a rear end of the ground electrode or a front end of the metallic shell by providing axial slits therewith, and each of the lock arms having a pawl at its top end;

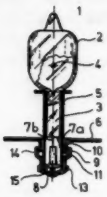
a groove circumferentially provided with an inner surface of the rest of the ground electrode or the metallic shell to be in registration with the pawls of the lock arms, whereby the lock arms elastically flexes to bring the pawls into an engagement with an inner wall of the groove when the metallic shell and the ground electrode are connected in series, and at the same time, the insulator is brought into an engagement with an inner side of each lock arm to deter the lock arms from being flexed inwardly when the insulator is placed.

5,073,742

INCANDESCENT LAMP WITH MOUNTING ASSEMBLY

Gyula Bussai; Györgyi Végh; Zoltán Losonczi; Ákos Ocsovai; István Pozsonyi; György Szabó, all of Budapest, and György Vajó, Göd, all of Hungary, assignors to Tungsram Részvénytá rsaság, Budapest, Hungary

Filed Feb. 22, 1990, Ser. No. 482,847
Int. Cl.[5] H01J 5/50
U.S. Cl. 313—318 9 Claims



1. An incandescent lamp, comprising a translucent envelope having a flattened end part having a substantially rectangular cross-section, a base element surrounding said flattened end part and having a substantially rectangular cross-section, an incandescent body arranged within said envelope, a connecting cable, a first current lead-in connected to the base element and to the incandescent body, a second current lead-in connected to the connecting cable and to the incandescent body and a centering plate having a rectangular opening for receiving said base element from one side facing said envelope, said centering plate being provided on a reverse side with at least one flange element,

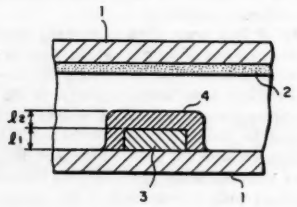
the improvement comprising a locating body facing said flange element, said locating body having an upper part for receiving said at least one flange element and a lower part shaped in U form for receiving said base element, said lower and upper parts constituting an integral unit, said locating body having in said upper part an edge covering at least partly said at least one flange element of said centering plate, said flange element of said centering plate intruding into a gap between said base element and said locating body, further said flange element of said centering plate and said locating body being connected with one another by a thermal method of joining.

5,073,743

ELECTRODE FOR DISCHARGE LIGHT SOURCE

Toshiro Kajiwara; Goroku Kobayashi; Keiji Fukuyama; Ko Sano; Yojiro Yano, and Keiji Watanabe, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1989, Ser. No. 432,777
Claims priority, application Japan, Mar. 20, 1989, 64-297
Int. Cl.[5] H01J 19/06, 17/04
U.S. Cl. 313—346 R 2 Claims



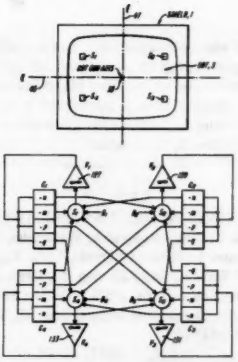
1. An electrode for a discharge light source, the electrode comprising a metal conductor located in a discharge container filled with a rare gas and a film of a material for secondary emission formed on the metal conductor, wherein the metal conductor is 1–5 μm thick, and the film of the material for secondary emission includes a compound comprising LaB_6 and Ba in an amount of 0.01–20 mol % of LaB_6, wherein the film of material is 0.5–2 μm thick.

5,073,744

METHOD AND APPARATUS FOR DYNAMIC MAGNETIC FIELD NEUTRALIZATION

Frederick T. Buhler, Providence, R.I., assignor to Interstate Electronics Corp., Anaheim, Calif.

Continuation-in-part of Ser. No. 345,575, May 1, 1989, Pat. No. 4,963,789. This application Oct. 3, 1990, Ser. No. 592,638
Int. Cl.[5] H01J 29/06
U.S. Cl. 315—8 10 Claims



1. Apparatus for controlling the magnitude and direction of a magnetic field within a specified volume in the presence of an ambient external magnetic field comprising,

a plurality of magnetic field sensors positioned in specific locations within said volume,

a plurality of coils, each of said coils being associated with one of said sensors,

electrical drive circuit means connecting each of said sensors to its associated coil and providing to that coil electrical current which varies in magnitude and direction in accordance with variations in magnitude and direction of the magnetic field detected by the associated one of said sensors,

feedback means coupling the output current from each of said drive circuits to its connected sensor and to the sensors positioned next adjacent to that sensor, said feedback means having individually adjustable feedback factors to each of said coupled sensors to provide for contribution by all of said sensors to controlling the magnetic field within said volume.

5,073,745

INVERTER CIRCUIT FOR STABLE ILLUMINATION OF DISCHARGE LAMP

Tsutomu Kakitani, Yokohama, Japan, assignor to Toshiba Lighting and Technology Group, Tokyo, Japan

Filed Sep. 28, 1990, Ser. No. 589,585
Claims priority, application Japan, Sep. 29, 1989. 1-252331
Int. Cl.[5] H05B 41/24, 41/36
U.S. Cl. 315—307 10 Claims

1. An inverter circuit for a discharge lamp, comprising:

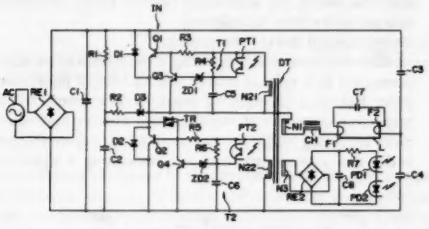
first switching means for supplying a resonant output signal; and

a series resonant circuit for energizing a discharge lamp by applying said resonant output signal from said first switching means; and

a current transformer having first, second, and third wind-

ings, and designed to output a predetermined signal to said second and third windings when said first winding is driven, said first winding inserted in said series resonant circuit; and

second switching means for controlling ON-OFF operations of said first switching means in response to signal output from said second windings of said current transformer; and



a time constant circuit, having a specific time constant, for controlling switching timing of said second switching means according to the specific time constant; and

control means for controlling said time constant of said time constant circuit in response to signal output from said third winding of said current transformer.

5,073,746

SPEED CONTROL METHOD FOR SERVOMOTORS

Keiji Sakamoto, Hachioji, and Yasusuke Iwashita, Yamanashi, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

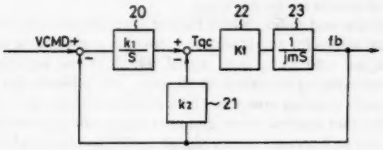
PCT No. PCT/JP89/10221, § 371 Date Jul. 25, 1990, § 102(e) Date Jul. 25, 1990, PCT Pub. No. WO90/06622, PCT Pub. Date Jun. 14, 1990

PCT Filed Dec. 5, 1989, Ser. No. 548,887

Claims priority, application Japan, Dec. 10, 1988, 63-311012

Int. Cl.[5] G05B *5/01*

U.S. Cl. 318—560 **6 Claims**



1. A speed control method for a servomotor, comprising the steps of:

(a) detecting feedback pulses at first intervals of a detection period equal to a value obtained by dividing an estimated speed calculation period by an integer multiple of 2;

(b) storing a first number of the feedback pulses detected in each of the first intervals of the detection period;

(c) calculating a first value indicative of a second number of feedback pulses detected and stored in a second interval corresponding to the estimated speed calculation period;

(d) calculating a second value indicative of a third number of feedback pulses detected in a third interval from a midpoint of an estimated speed calculation period immediately before the estimated speed calculation period corresponding to the second interval to a midpoint of the estimated speed calculation period; and

(e) calculating an estimated speed indicative of an actual rotation speed of the servomotor based upon the first value and the second value.

5,073,747

FEEDBACK SYSTEM CONTROL DEVICE AND APPLICATIONS IN AMPLIFIERS AND SERVOMECHANISMS

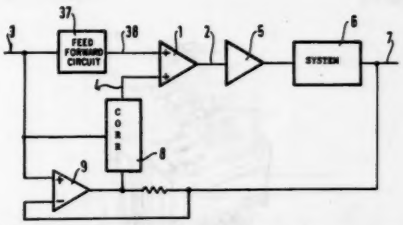
Jean-Pierre Dupraz, Lyons, and Jean-Paul Moncorge, Vaux en Velin, both of France, assignors to GEC Alsthom SA, Paris, France

Filed Aug. 30, 1990, Ser. No. 574,724

Claims priority, application France, Aug. 30, 1989, 89 11386

Int. Cl.[5] G05B *13/00*

U.S. Cl. 318—561 **16 Claims**



1. Feedback system control device for controlling a feedback system, said control device comprising an adder adapted to produce a control signal from a feed forward signal and a correction signal, a system for processing said control signal and driving said feedback system which is adapted to produce an output signal, an error amplifier adapted to process the difference betwen an input signal and said output signal and to produce an error signal, a four-pole network adapted to receive said input signal and to produce said feed forward signal, a corrector adapted to produce said correction signal from said error signal, said corrector comprising two processors each adapted to receive said error signal and to produce respective modification signals between which there is a relative phase shift, and a summing circuit adapted to sum said modification signals to produce said correction signal.

5,073,748

METHOD FOR LIMITING THE RATE-OF-CHANGE OF ACCELERATION IN NUMERICAL DRIVING SYSTEMS

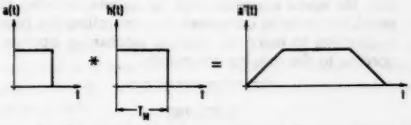
Manfred Boehm, Pretzfeld, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 27, 1990, Ser. No. 589,077

Claims priority, application European Pat. Off., Sep. 27, 1989, 89117900.4

Int. Cl.[5] G05B *19/18*

U.S. Cl. 318—569 **1 Claim**



1. A method for limiting a rate-of-change of acceleration for a numerically controlled, driving system comprising the steps of:

(a) determining acceleration-controlled, discrete control values for the driving system;

(b) inputting said discrete control values to a pulse time filter at discrete command times, said pulse time filter having a unity steady state gain and a pulse width in a time domain that is a multiple of a difference between the command times;

(c) filtering said discrete control values with the pulse time filter; and

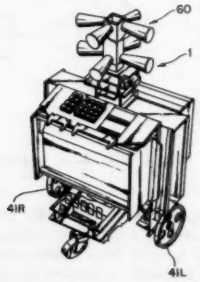
(d) applying the filtered discrete control values to the driving system.

5,073,749

MOBILE ROBOT NAVIGATING METHOD

Yutaka Kanayama, Goleta, Calif., assignor to Shinko Electric Co., Ltd. and Sogo Securities Co., Ltd., both of Tokyo, Japan

Filed Jun. 19, 1990, Ser. No. 540,151
Claims priority, application Japan, Jun. 22, 1989, 1-158250
Int. Cl.[5] G06F *15/50*
U.S. Cl. 318—587 **5 Claims**



1. A mobile robot navigating method for navigating an autonomous mobile robot comprising a path planning unit, a posture control unit, a command signal converting unit, a current posture computing unit, and a running mechanism, said method comprising:

obtaining current robot posture data based on travelling operations executed by the robot;

periodically sending said current posture data from the current posture computing unit to the posture control unit at predetermined time intervals;

obtaining speed correction feedback control data and angular velocity correction feedback control data;

periodically feeding forward from the path planning unit to the posture control unit (1) desired posture data, (2) a desired speed feed-forward command which is independent of said speed correction feedback control data, and (3) a desired angular velocity feed-forward command which is independent of said angular velocity correction feedback control data;

calculating, by means of said posture control unit, a speed command which is based on said desired speed feed-forward command and said speed correction feedback control data, and an angular velocity command which is based on said desired angular velocity feed-forward command and said angular velocity correction feedback control data; and

converting, by means of said command signal converting unit, the speed command and the angular velocity command into running commands for controlling the running mechanism to make the running mechanism operate according to the running commands.

5,073,750

REMOTE CONTROL APPARATUS FOR INSTALLATION OF ELECTRICAL TOY AND CIRCUIT

Jean-Pierre Coron, Dampierre et Flee, France, assignor to Jouef Industries S.A., Champagnole, France

Filed Jan. 30, 1990, Ser. No. 472,238
Claims priority, application France, Jan. 31, 1989, 89 01565; Jun. 7, 1989, 89 07748
Int. Cl.[5] A63H *30/04, 19/24*
U.S. Cl. 318—58.7 **13 Claims**

1. In an installation of electrical toys having a circuit of the type comprising

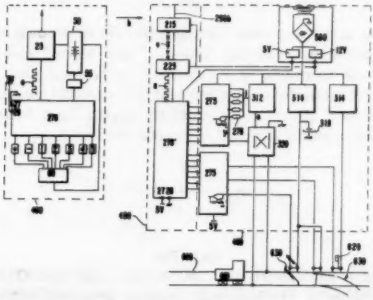
at least one conductive rail for guiding one or more electric motor-driven models and for supplying electrical energy to the models, first electrical means for respectively transforming, regulating, and modulating mains electrical energy and supplying the conductive rail with the electrical energy,

means adapted to receive one or more ON/OFF type accessories, second electrical means for supplying electrical energy to the ON/OFF type accessories,

means adapted to receive one or more pulse operated accessories, each being responsive to electric pulses, and third electrical means for generating electric pulses to control said pulse operated accessories,

a remote control device comprising:

a portable radio emitter comprising a succession of switches connected to a voltage source and an emitter microcomputer having a plurality of input circuits connected to respective ones of said switches, said emitter microcomputer including means for storing different pre-established codes and a microprocessor for associating a signal re-



ceived from one of said switches selectively actuated by the user with an address of said storage means containing a corresponding code, the microcomputer applying said corresponding code to an output circuit in the form of a first binary signal,

a fixed radio receiver which comprises a receiver microcomputer having an input circuit for receiving a second binary signal and means for interpreting said second binary signal to trigger at least one of said first, second and third electrical means of the device,

wherein said radio emitter further comprises fourth electrical means for amplifying and reprocessing said first binary signal into an emitted signal which is less sensitive to surrounding electrical interference, and wherein the fixed radio receiver comprises fifth electrical means for receiving said emitted signal and converting said emitted signal into said second binary signal, said fifth electrical means comprising means for applying said second binary signal to an input of said receiver microcomputer.

5,073,751

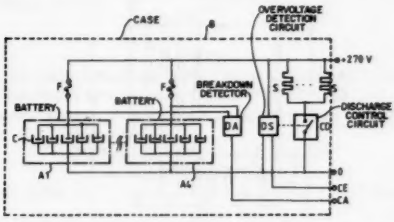
CAPACITIVE TYPE ELECTRIC ENERGY ACCUMULATOR OF HIGH CAPACITY

Michel Kaitandjian, Le Chesnay; Philippe J. Pradat, Les Ulis; Jean P. Latouche-Hallé, Longjumeau, and Alain M. Falipou, Velizy, all of France, assignors to Compagnie de Signaux et d'Equipements Electroniques and Etat Francais Represente Par le Delegue Genral Pour L'Armement, both of, France

Filed May 5, 1989, Ser. No. 348,263
Claims priority, application France, May 6, 1988, 88 06162
Int. Cl.[5] H02J *7/00;* H02H *7/16*
U.S. Cl. 320—1 **4 Claims**

1. An electric energy accumulator of capacitive type for use in an electrically motorized turret of a tank, said turret comprising a generally circular rotatable member, the accumulator comprising: a plurality of cases each defining a circular sector, said cases being placed side by side so as to form at least a

partial ring mounted to the generally circular rotatable member of the turret, heat dissipation shunts integrated in each said case, a plurality of electrochemical capacitors connected in parallel and disposed inside each said case, each said case further housing an over-voltage detection circuit and a circuit



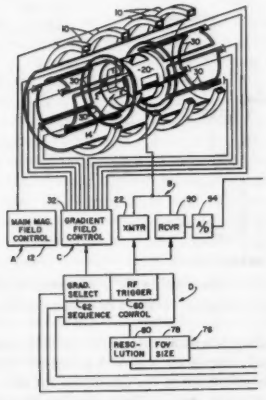
for controlling discharge of the capacitors into the heat dissipation shunts in the case, whereby the capacitors are discharged when an abnormal over-voltage is detected, thereby avoiding explosion of the capacitors and resulting damage in proximity to the turret of the tank.

5,073,752

DISCRETE FOURIER TRANSFORM IMAGING

Gordon D. DeMeester, Wickliffe; Kenneth S. Denison, Shaker Hts., and Francis H. Bearden, Twinsburg, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Apr. 19, 1990, Ser. No. 510,981
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—309 **26 Claims**



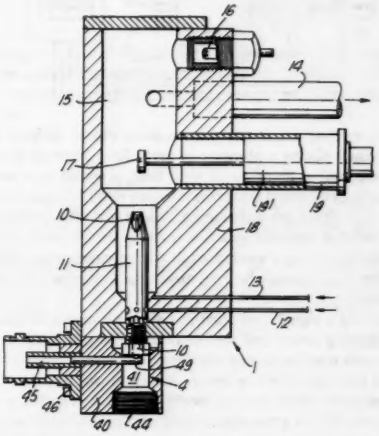
1. A method of magnetic resonance imaging comprising:
automatically determining a first dimension of a region of interest along a first phase encode direction;
dividing the first dimension by a selected resolution in the first direction to determine a number of steps of a first phase encode gradient to be applied along the first direction;
collecting magnetic resonance data lines with each of the first direction phase encode gradient steps;
digitizing the magnetic resonance data lines; and,
Fourier transforming on the digitized data lines in at least two dimensions to generate an image representation, the Fourier transforming step including using a discrete Fourier transform with respect to one of the dimensions.

5,073,753

HYDROCARBON FLAME IONIZATION DETECTOR

Nicholas Collings; Steven Dinsdale, and Jonathan Willey, all of Cambridge, England, assignors to Cambustion, Limited, England

PCT No. PCT/GB88/00618, § 371 Date Feb. 1, 1990, § 102(e) Date Feb. 1, 1990, PCT Pub. No. WO89/01149, PCT Pub. Date Feb. 9, 1989
PCT Filed Jul. 28, 1988, Ser. No. 460,869
Claims priority, application United Kingdom, Aug. 3, 1987, 8718332; Sep. 14, 1987, 8721542; Oct. 27, 1987, 8725093
Int. Cl.[5] G01N *27/62*
U.S. Cl. 324—468 **9 Claims**



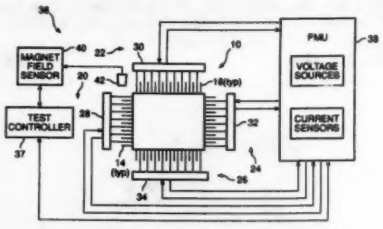
1. A flame ionization detector having improved response time to changes in a hydrocarbon sample gas obtained from a sample gas supply, said flame ionization detector comprising:
a housing, said housing defining a flame chamber for burning hydrogen, an oxidant and the sample gas therein;
a nozzle having a base mounted in said housing, said nozzle extending into said chamber and having a tip at which the burning occurs;
inlet means for supplying the hydrogen, the oxidant and the sample gas to said flame chamber, said inlet means for said sample gas comprising conduit means passing along said nozzle and having a first end adjacent said nozzle tip for emitting the sample gas;
means for igniting the sample gas emitted from said sample gas inlet means;
an exhaust outlet through which the products of combustion are removed from said flame chamber;
a collector electrode electrically insulated from said housing, said nozzle and housing being electrically connected together and grounded, said collector electrode being maintained in use, at a predetermined potential relative to ground; and
a pre-chamber within said housing and couplable to the sample gas supply, said pre-chamber having a second end of said sample gas inlet conduit means extending therein for receiving sample gas from the supply, said pre-chamber being disposed immediately adjacent said base of said nozzle for minimizing the length of the path the sample gas must travel in said flame ionization detector thereby to improve its response time, said pre-chamber being adapted to maintain a substantially constant static pressure in said sample gas inlet means, whereby the pressure of the sample gas supplied to said nozzle remains substantially constant.

5,073,754

METHOD AND APPARATUS FOR TESTING LCD PANEL ARRAY USING A MAGNETIC FIELD SENSOR

Francois J. Henley, Los Gatos, Calif., assignor to Photon Dynamics, Inc., San Jose, Calif.

Filed Jul. 24, 1990, Ser. No. 557,257
Int. Cl.[5] G01R 31/28; G09G 3/30
U.S. Cl. 324—529 3 Claims



1. A method for locating cross-short circuit defects in an LCD panel having a plurality of drive lines oriented in a first direction and a plurality of gate lines oriented in a second generally orthogonal direction creating row/column intersections, each drive line terminating along a first edge of the panel being shorted together by a first shorting means, each gate line terminating along a second edge of the panel being shorted together by a second shorting means, said method comprising the steps:

applying a signal to at least one shorting means of said first shorting means and said second shorting means;

for each one line of said plurality of lines terminating at said at least one shorting means, scanning said one line with a magnetic field sensing means to detect whether a magnetic field is generated at said one line, wherein any said one line generating a magnetic field has a short circuit defect;

for each one line of said plurality of lines terminating at a shorting means other than said at least one shorting means, scanning said one line with a magnetic field sensing means to detect whether a magnetic field is generated at said one line, wherein any said one line generating a magnetic field has a short circuit defect; and

comparing the magnetic field strength for each said one line, wherein, each said one line having substantially the same magnetic field strength is indicated as being involved in at least one common short circuit defect.

5,073,755

METHOD AND APPARATUS FOR MEASURING THE ELECTRICAL PROPERTIES OF DIELECTRIC FILM IN THE GIGAHERTZ RANGE

Richard D. Neufeld, Vancouver, Canada, assignor to MPR Teltech Ltd., Burnaby, Canada

Filed Mar. 19, 1990, Ser. No. 495,043
Int. Cl.[5] G01N 22/00
U.S. Cl. 324—632 11 Claims

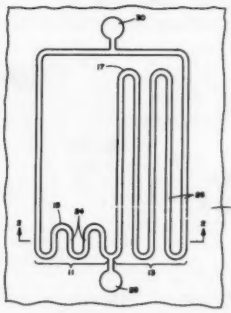
1. A dielectric test device formed on a substrate, comprising:

(a) a conductive ground plane layer formed over said substrate;

(b) a dielectric layer over said ground plane layer;

(c) a short and a long conductive strip overlying said dielectric layer, each of said strips being substantially identical in all respects which affect wave guide properties except for length with said long strip being longer than said short strip;

(d) means for coupling identical input signals of a single frequency and the same amplitude and phase to an input end of each of said short and long conductive strips; and



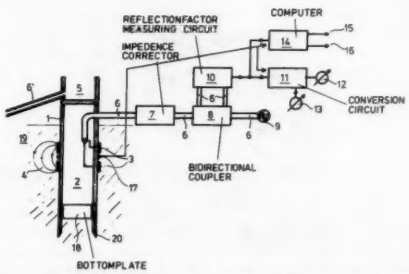
(e) a common output pad at an output end of each of said short and long strips for adding together said signals after propagation down said short and long conductive strips.

5,073,756

METHOD AND APPARATUS FOR MEASURING THE VOLUMETRIC WATER CONTENT OF MINERAL AND/OR ORGANIC MIXTURES

Alexander Brandelik, Karlsruhe, Fed. Rep. of Germany, assignor to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Jun. 25, 1990, Ser. No. 543,133
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1989, 3920787
Int. Cl.[5] G01N 22/04; G01R 27/06
U.S. Cl. 324—643 17 Claims



1. A method of determining the volumetric water content of a mineral and/or organic mixture having a density, comprising the steps of:

(a) introducing a measuring probe having measuring electrodes and an exterior wall at a given position in the mixture without changing the density of the mixture and such that the exterior wall of the probe lies closely against the mixture;

(b) charging the measuring electrodes with a high frequency electromagnetic wave so as to generate an HF field in a region of the measuring electrodes, and to reflect a wave from the electrodes,

(c) measuring a complex reflection factor of the reflected wave at a temperature T_1 of the mixture;

(d) cooling the probe and the surrounding mixture to a temperature T_2 such that all water in a volume of the mixture covering most of the HF field is frozen;

(e) measuring the complex reflection factor of the reflected wave with the surrounding mixture at the temperature T_2;

(f) determining the respective dielectric constants for the mixture at the temperatures T_1 and T_2 from the complex

reflection factors measured in said steps (c) and (e), with the aid of an invariable probe-specific calibration curve; and

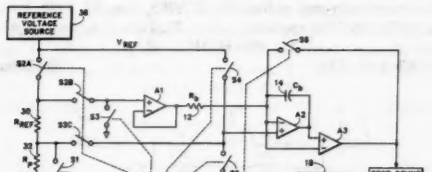
(g) calculating the volumetric water content of the mixture from the two dielectric constants of the mixture determined in said step (f) and known dielectric constants of water and ice.

5,073,757

APPARATUS FOR AND METHOD OF MEASURING CAPACITANCE OF A CAPACITIVE ELEMENT

Richard E. George, Everett, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Sep. 23, 1988, Ser. No. 248,489
Int. Cl.[5] G01R *27/26*
U.S. Cl. 324—677 **7 Claims**



1. Apparatus for measuring capacitance of a capacitive element, comprising:

a charging circuit comprising a reference resistor connectable in series with said capacitive element, and a D.C. reference voltage source connectable across the series combination of said reference resistor and said capacitive element to charge said capacitive element to said reference voltage in a first operating state;

charge accumulating means including a series combination of an input resistor and a storage capacitor coupled in said first operating state to said charging circuit for sensing charging current through said reference resistor and developing therefrom a corresponding proportional current through said input resistor to said storage capacitor to accumulate on said storage capacitor a charge proportional to the capacitance of said capacitive element; and

measurement means coupled in a second operational state to said charge accumulating means for measuring said charge,

wherein said charge accumulating means comprises an integrating operational amplifier which in said first operating state has a first input coupled through said input resistor to one end of said reference resistor and a second input coupled to an opposite end of said reference resistor to integrate a current proportional to current through said reference resistor.

5,073,758

RESISTANCE MEASUREMENT IN AN ACTIVE AND HIGH TEMPERATURE ENVIRONMENT

Lester B. Postlewait, and Charles M. Newton, both of Cheraw, S.C., assignors to Cooper Industries, Inc., Houston, Tex.

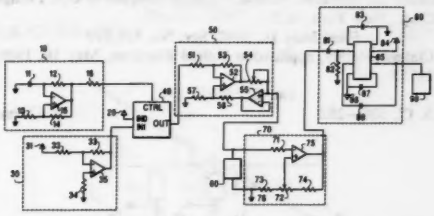
Filed Mar. 30, 1990, Ser. No. 501,730
Int. Cl.[5] G01R *27/08*
U.S. Cl. 324—713 **21 Claims**

1. A method for measuring the resistance of a part of a powered soldering iron, comprising:

providing an a.c. signal;

passing the a.c. signal through said part of the soldering iron to modify said a.c. signal;

transmitting the modified a.c. signal through a full-wave rectifier to obtain a full-wave rectified signal; and



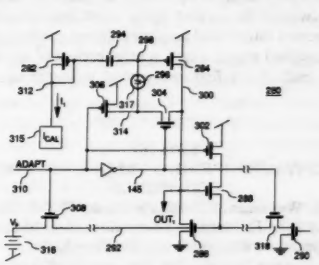
averaging the full-wave rectified signal over time to generate a direct current signal having an amplitude which is proportional to the resistance of said part of the soldering iron.

5,073,759

ADAPTABLE CURRENT MIRROR

Carver A. Mead, Pasadena, and Timothy P. Allen, Palo Alto, both of Calif., assignors to Synaptics, Incorporated, San Jose, Calif.

Division of Ser. No. 486,336, Feb. 28, 1990, which is a continuation-in-part of Ser. No. 282,176, Dec. 9, 1988, Pat. No. 4,935,702. This application Oct. 31, 1990, Ser. No. 607,141
Int. Cl.[5] H03F *3/16*
U.S. Cl. 330—288 **3 Claims**



1. An adaptable current mirror having an input node and an output node, including:

first and second MOS transistors, each having a source, a gate, and a drain,

first and second MOS capacitors, each having first and second electrodes,

the source of said first MOS transistor being connected to a source of fixed voltage, the gate and drain of said first MOS transistor being connected to said input node and to said first electrode of said first capacitor, the source of said second MOS transistor being connected to a source of fixed voltage, the gate of said second MOS transistor being connected to said second electrode of said first capacitor and to said first electrode of said second capacitor, the drain of said second MOS transistor forming said output node and being connected to said second electrode of said second capacitor,

means for supplying a calibration current to said input node during adaptation,

means for selectively supplying a desired output current to said output node during adaptation,

means for selectively illuminating said first and second electrodes of said second capacitor with ultraviolet light during adaptation,

whereby the output current of said current mirror is adapted

to be equal to said desired output current when its input current is equal to said calibration current.

5,073,760

D.C. BLOCKING AMPLIFIER

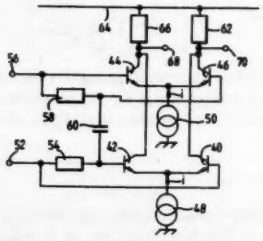
Anthony H. Richards, Milton, England, assignor to U.S. Philips Corp., New York, N.Y.

Filed May 10, 1990, Ser. No. 521,770

Claims priority, application United Kingdom, May 10, 1989, 8910753

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—252 **20 Claims**



1. A d.c. blocking amplifier comprising first and second differential amplifiers, first and second balanced signal input lines, the first signal input line being d.c. connected only to the first differential amplifier which in operation amplifiers an a.c. signal applied by way of the first signal input line, the second signal input line being d.c. connected only to the second differential amplifier which in operation amplifies an a.c. signal applied by way of the second signal input line, outputs of the first and second differential amplifiers being combined to produce an amplified signal which is independent of the d.c. conditions on each of the first and second balanced signal input lines.

5,073,761

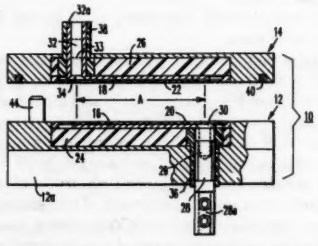
NON-CONTACTING RADIO FREQUENCY COUPLER CONNECTOR

Timothy G. Waterman, Eldersburg; Jimmy W. Mullis, Catonsville, and John H. Staehlin, Lutherville, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 5, 1990, Ser. No. 533,477

Int. Cl.[5] H01P *1/04*

U.S. Cl. 333—24 C **21 Claims**



1. A radio frequency coupler connector having first and second connection terminals, comprising:

a housing having a first housing portion and a second housing portion connected to and fixed relative to said first housing portion, said first and second housing portions respectively including first and second substantially planar surfaces, said first and second housing portions being disconnectable from each other at said first and second substantially planar surfaces, and said first and second housing portions being respectively associated with the first and second connection terminals;

a first open-ended launcher operatively connected to the first connection terminal, said first open-ended launcher being associated with said first housing portion; and

a second open-ended launcher operatively connected to the second connection terminal, said second open-ended launcher being associated with said second housing portion, said first and second open-ended launchers being spaced apart and disposed in an at least partially overlapping relationship so as to be capacitively coupled when said first and second housing portions are connected together.

5,073,762

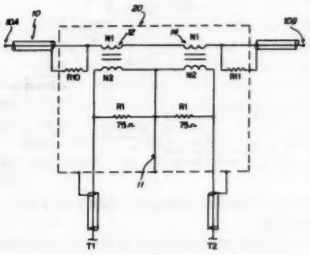
LOW FREQUENCY CARRIERBAND MULTI-PORT SIGNAL COUPLER

Hong Yu, Nashua, N.H., assignor to CaSat Technology, Inc., Amherst, N.H.

Continuation-in-part of Ser. No. 277,753, Nov. 30, 1988, Pat. No. 4,973,926. This application Nov. 21, 1990, Ser. No. 616,432

Int. Cl.[5] H03H *7/48*

U.S. Cl. 333—112 **20 Claims**



1. A low frequency multi port signal coupler for intercoupling with a communication line and separate utilization devices, said low frequency multi port signal coupler having a pair of terminals coupled to said communication line, a pair of output taps coupled to at least one utilization device, a pair of resistors coupled to the communication line at said terminals, a pair of transformers, each of said transformers having primary and secondary windings, said pair of primary windings being coupled to said communication line in series between said pair of terminals, and termination resistor means coupling said secondary windings to said output taps.

5,073,763

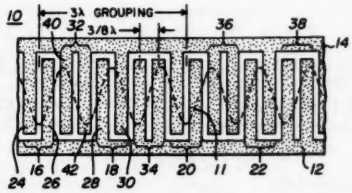
GROUP SINGLE-PHASE UNIDIRECTIONAL TRANSDUCERS WITH ⅛λ AND ¼λ SAMPLING

Peter Wright, Dallas, Tex., assignor to R.F. Monolithics, Inc., Dallas, Tex.

Filed Nov. 2, 1990, Ser. No. 608,354

Int. Cl.[5] H03H *9/145;* **H01L** *41/08*

U.S. Cl. 333—193 **34 Claims**



1. An improved surface acoustic wave transducer comprising:

a pattern of at least three adjacent interdigitated electrodes on a piezoelectric substrate; and

each of said interdigitated electrodes lying on a $\frac{1}{4}\lambda$ grid such that adjacent electrodes have a center-to-center spacing of $\frac{1}{4}\lambda$ where λ=one wavelength.

5,073,764

CURRENT LIMITING APPARATUS

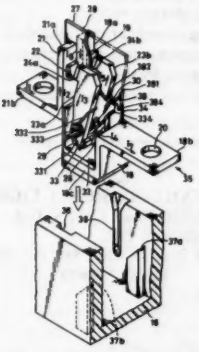
Mitsugu Takahashi; Yoshiaki Kobayashi; Takao Mitsuhashi, all of Amagasaki, and Shinji Yamagata, Fukuyama, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 17, 1990, Ser. No. 583,318

Claims priority, application Japan, Sep. 18, 1989, 1-241343; Sep. 18, 1989, 1-241346; Sep. 18, 1989, 1-241347; Sep. 18, 1989, 1-241348; Sep. 18, 1989, 1-241354; Jun. 27, 1990, 2-171903

Int. Cl.[5] H01H *75/00*

U.S. Cl. 335—16 8 Claims



1. A current limiting apparatus, comprising:

a casing;

a first stationary contact arm which is fixedly mounted in said casing and has a first stationary contact;

a first movable contact arm which is pivotally mounted in said casing and has a first movable contact, said first movable contact arm being urged to press said first movable contact against said first stationary contact, said first movable contact arm extending substantially parallel with said first stationary contact arm alongside a length of said first stationary contact arm which extends from said first stationary contact to a portion of said first stationary contact arm remote from said first stationary contact;

a second stationary contact arm which is fixedly mounted in said casing and has a second stationary contact; and

a second movable contact arm which is pivotally mounted in said casing and has a second movable contact, said second movable contact arm being urged to press said second movable contact against said second stationary contact, said second movable contact arm extending substantially parallel with said second stationary contact arm alongside a length of said second stationary contact arm which extends from said second stationary contact to a portion of said second stationary contact arm remote from said second stationary contact, said second movable contact arm being electrically connected in series with said first movable contact arm.

5,073,765

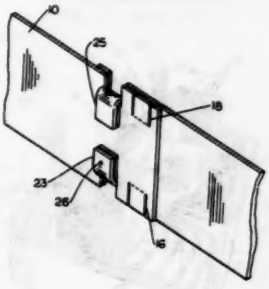
RETAINING BAND FOR A TRANSFORMER CORE

Harry T. Denner, Zanesville, Ohio, assignor to Cooper Power Systems, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 349,733, May 9, 1989, abandoned. This application Nov. 7, 1990, Ser. No. 610,183

Int. Cl.[5] H01F *27/26*

U.S. Cl. 336—210 9 Claims



1. A magnetic core loop mounted on a transformer coil, comprising:

a magnetic core having multiple laminated magnetized strips of a material which can be magnetized, said strips forming a loop of overlapping layers;

a substantially planar band of metal having an end section on each end and a width which completely surrounds and covers the outer periphery of said magnetic core, said band being bent around the periphery of said magnetic core so that one end section overlaps the other end section to form an overlapping region;

said overlapping region having a length to accommodate first and second connection means for connecting said end sections of said band, said first connection means connecting said band at a first circumferential distance around said magnetic core loop and said second connection means connecting said band at a second circumferential distance around said magnetic core loop;

said first connection means including first opposed pairs of incisions in said overlapping region which extend through both end sections in a direction substantially transverse to the sides of the band, each first opposed pair being located on opposite sides of said overlapping region;

each first opposed pair of said incisions forming a first tab therebetween, aid first tabs being folded over towards the center of the band and crimped such that said first tabs engage the surface of the band to hold said end sections together at said first circumferential distance and retain said magnetic core during an annealing process;

said first connection means being releasable by uncrimping said first tabs after the annealing process to assemble the magnetic core loop onto the transformer coil;

said second connection means including second opposed pairs of incisions in said overlapping region which extend through both end sections in a direction substantially transverse to the sides of the band, each second opposed pair being located on opposite sides of said overlapping region;

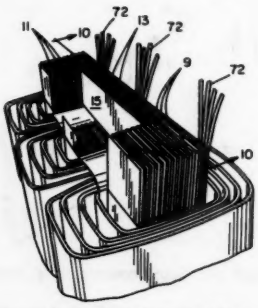
each second opposed pair of said incisions forming a second tab therebetween, said second tabs being folded over towards the center of the band and crimped such that said second tabs are adapted to engage the surface of the band holding said end sections and magnetic core together after assembly of the magnetic core onto the transformer coil, said first tabs not being in alignment after the annealing process to assemble the magnetic core onto the transformer coil.

5,073,766

TRANSFORMER CORE AND METHOD FOR STACKING THE CORE

Eric L. Hays, Oshkosh, Wis., assignor to Square D Company, Palatine, Ill.

Filed Nov. 16, 1990, Ser. No. 614,812
Int. Cl.[5] H01F 27/26
U.S. Cl. 336—217 5 Claims



1. A transformer core assembly comprising:

a first plurality of generally E-shaped laminations, each lamination of said first plurality having a base portion, a first outer leg extending a first predetermined distance outward from said base portion, a middle leg extending substantially said same first predetermined distance outward from said base portion and a second outer leg having an extending outer leg portion extending substantially beyond said first predetermined distance outward from said base portion;

a second plurality of generally E-shaped laminations, each lamination of said second plurality having a base portion, a first outer leg extending a second predetermined distance outward from said base portion, a middle leg extending substantially said same second predetermined distance outward from said base portion and a second outer leg having an extending outer leg portion extending substantially beyond said second predetermined distance outward from said base portion;

said first plurality of laminations alternately stacked with said second plurality of laminations such that said second outer legs of said first plurality of laminations are positioned at one end of the core and said second outer legs of said second plurality of laminations are at an opposite end;

said first outer legs of said second plurality of laminations alternately positioned with said second outer legs of said first plurality of laminations and said first outer legs of said first plurality of laminations alternately positioned with said second outer legs of said second plurality of laminations;

said middle legs of said first plurality of laminations alternately positioned with said middle legs of said second plurality of laminations,

said middle leg of said first plurality of laminations extending beyond said middle leg of said second plurality of laminations and providing a channel portion therebetween;

a first coil surrounding said plurality of first outer legs; a second oil surrounding said plurality of middle legs; and a third coil surrounding said plurality of second outer legs;

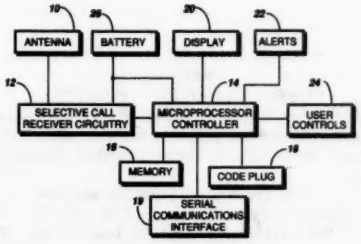
a plurality of generally I-shaped laminations interleaved within the spaces between said plurality of extending outer leg portions of said first outer legs or interleaved within the spaces between said plurality of extending outer leg portions of said second outer legs and supported on said middle legs and extending to said other outer leg.

5,073,767

SELECTIVE CALL RECEIVER THEFT PROTECTION DEVICE

Thomas F. Holmes; Rick Johnson, and Brian P. Lenhart, Jr., all of Boynton Beach, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 5, 1989, Ser. No. 446,368
Int. Cl.[5] H04Q 1/30; G08B 5/22
U.S. Cl. 340—311.1 29 Claims



5. A selective call receiver comprising:

a reprogrammable memory;

an input/output interface for allowing communication between said reprogrammable memory and an external programming device; and

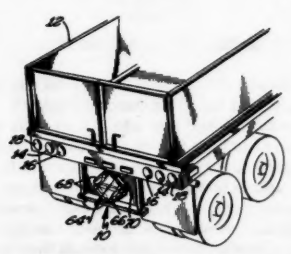
device disabling means for user disabling said selective call receiver in response to a predetermined number of unauthorized attempts by said external programming device to reprogram at least a portion of said reprogrammable memory.

5,073,768

AUXILIARY SIGNAL LIGHTS

Rodney M. Willaredt, Rapid City, S. Dak., assignor to Nolan Ulmer, McLaughlin, S. Dak.

Filed Dec. 23, 1988, Ser. No. 289,217
Int. Cl.[5] B60Q 1/34
U.S. Cl. 340—475 16 Claims



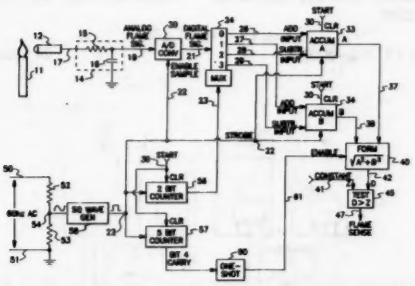
1. Signal for use with a vehicle having an electrical system comprising, in combination: means for providing turn direction signals for the vehicle in the form of first and second arrowheads having a generally horizontal V-shape and pointing in opposite directions forming a square having a horizontal diagonal and in the form of an arrow shank for the arrowheads lying along the horizontal diagonal, with the first and second arrowheads each including at least two lights and with the arrow shank including at least one light, wherein the lights of the first arrowhead are electrically connected in parallel to the light of the arrow shank through a first diode and the lights of the second arrowhead are electrically connected in parallel to the light of the arrow shank through a second diode with the light of the arrow shank being lit when either of the first and second arrowheads are lit; and means for securing the providing means to the vehicle.

5,073,769

FLAME DETECTOR USING A DISCRETE FOURIER TRANSFORM TO PROCESS AMPLITUDE SAMPLES FROM A FLAME SIGNAL

Arlon D. Kompelien, Crosslake, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 31, 1990, Ser. No. 608,054
Int. Cl.[5] G08B 17/12
U.S. Cl. 340—578 7 Claims



1. A flame sensing system for providing a flame sense signal responsive to receiving a flame signal from a photocell receiving radiative energy from a flame having in its energy output intensity a flicker whose frequency is within a predetermined frequency range, said flame signal instantaneously representative of the intensity of the energy emanating from the flame, the system comprising

a) a low pass filter receiving the flame signal and providing a filtered flame signal from which a substantial percentage of the amplitude of frequencies above the predetermined frequency range has been removed;

b) a clock circuit providing a clock signal having individual pulses at four times the frequency of the midpoint of the predetermined frequency range;

c) an analog to digital converter receiving the filtered flame signal and the clock signal, sampling he filtered flame signal responsive to each clock signal pulse, and providing a digital flame signal having a plurality of successive discrete, ordinary designated, digital values each encoding the amplitude of the filtered flame signal at successive sampling instants;

d) a fist accumulator register receiving the digital flame signal and forming from the plurality of digital values in the flame signal, the sum of the difference of successive pairs of digital values having even oridinal designations, and providing after a sampling instant a first intermediate digital transform signal ascending he current contents o the fist accumulator register;

e) a second accumulator register receiving the digital flame signal and forming from the plurality of digital values in the flame signal, the sum of he difference of successive pairs of digital values having odd ordinal designations, and providing after a sampling instant a second intermediate digital transform signal encoding the current contents of the second accumulator register;

f) a calculator means receiving the first ad second intermediate digital transform signals, and providing a transform signal at lest approximately equal o the square root of the sum of the squares of the digital value encoded in each of the fist and second intermediate digital transform signals; and

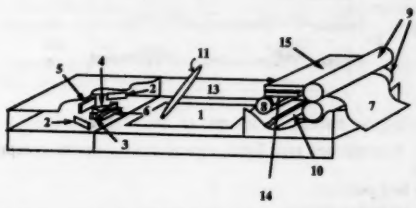
g) a comparator means receiving he transom signal for comparing the digital value encoded in the transform signal with a predetermined transform constant value, and if generator than the transform constant value, issuing a flame sense signal signifying presence of flame.

5,073,770

BRIGHTPEN/PAD II

Hugh G. Lobner, c/o Crown Industries, 155 N. Park St., East Orange, N.J. 07017

Continuation-in-part of Ser. No. 46,722, May 7, 1987, Pat. No. 4,949,079, which is a continuation-in-part of Ser. No. 725,126, Apr. 19, 1985, abandoned. This application Aug. 3, 1990, Ser. No. 563,096
The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.
Int. Cl.[5] G09G 5/00
U.S. Cl. 340—706 10 Claims



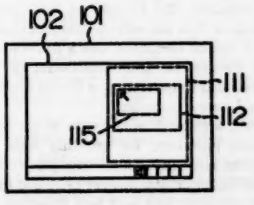
1. An apparatus for digitizing graphic information on sheets of paper comprising photodetectors and imaging systems capable of imaging graphic information on said sheets of paper, and which said photodetectors are also used to digitize the coordinate position of a light emitting stylus or light absorbing stylus by means of converting analog signals from said photodetectors to digital signals suitable for input into a computer or the like.

5,073,771

CONTROL METHOD OF ZOOMING SCREEN

Masayuki Satta, Ebina; Katsuya Takanashi, Hadano, and Kunihiro Yanagi, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 305,958
Claims priority, application Japan, Mar. 2, 1988, 63-47445
Int. Cl.[5] G09G 1/06
U.S. Cl. 340—721 12 Claims



1. An apparatus for controlling a display device having a zooming function, the display device being capable of displaying on a physical screen a logical screen different in size from the physical screen, the apparatus comprising:

means for displaying on the physical screen a first frame similar in shape to the entire logical screen;

means for displaying on the physical screen, within the first frame, a second frame similar in shape to a first area of the logical screen subjected to a zooming operation;

means for moving and zooming the second frame to a desired position on the physical screen with aid of a coordinate input device to specify a desired area of the logical screen as a third frame different in size from said second frame; and,

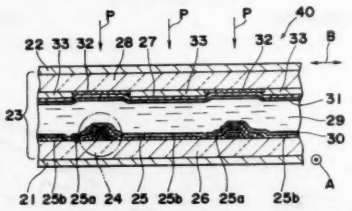
means for displaying on the physical screen the third frame, while not displaying on the physical screen, areas of the logical screen out of the desired area.

5,073,772

LIQUID CRYSTAL DISPLAY DEVICE

Yutaka Takafuji; Takashi Inami, and Hisashi Atarashi, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 3, 1989, Ser. No. 305,779
Claims priority, application Japan, Feb. 6, 1988, 63-26171
Int. Cl.[5] G09G 3/36
U.S. Cl. 340—784 6 Claims



1. A projection type liquid crystal display device comprising:

a first polarizer;

a second polarizer;

first and second transparent insulating substrates arranged in parallel to each other;

a liquid crystal display cell arranged between said first and second polarizers for displaying an image thereon, said liquid crystal display cell including a liquid crystal layer arranged between said first and second transparent insulating substrates;

first transparent electrodes formed on an inner surface of said first transparent insulating substrate;

second transparent electrodes formed on an inner surface of said second transparent insulating substrate so as to cross said first transparent electrodes;

switching means, including a transistor arranged on an inner surface of said first transparent insulating substrate, for controlling an applied voltage between said first and second transparent electrodes so as to drive picture elements defined at the crossings between said first and second transparent electrodes, said switching means including a gate electrode of the transistor formed on the inner surface of said first transparent insulating substrate, an electrically insulating film formed on said gate electrode, a semiconductor film formed on said electrically insulating film and a source electrode and a drain electrode of the transistor formed on said semiconductor film, wherein thickness of said semiconductor film is greater than thickness of said gate electrode;

a light source, arranged on the side of an outer surface of said second polarizer, for emitting light through said second polarizer, said second transparent insulating substrate, said liquid crystal display cell, said first transparent insulating substrate and said first polarizer toward a display screen arranged on the side of an outer surface of said first polarizer, said emitted light having a large enough intensity so as to project an image displayed on said liquid crystal display cell onto said display screen so that said projected image can be viewed; and

shading means arranged on the second transparent insulating substrate for shading light incident to at least a rim portion of said first transparent electrode and said switching means;

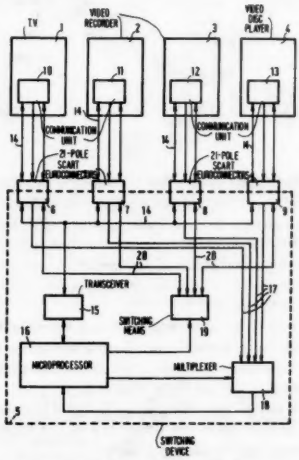
wherein the respective polarization axes of said first and second polarizers are set so that the light emitted from said light source is prevented from transmitting through said second polarizer, said liquid crystal display cell and said first polarizer, at the time of the application of a predetermined voltage between said first and second transparent electrodes, and the light therefrom is allowed to transmit therethrough at the time of the application of zero voltage therebetween.

5,073,773

METHOD OF ESTABLISHING A SIGNAL PATH BETWEEN AT LEAST TWO APPARATUSES AND AN ARRANGEMENT OF AT LEAST TWO APPARATUSES FOR REALISING THE METHOD

Bernard Van Steenbrugge, and Egbertus J. Berkhoff, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 86,442, Aug. 17, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,750
Claims priority, application Netherlands, Aug. 18, 1986, 8602090
Int. Cl.[5] H01H 67/00
U.S. Cl. 340—825.03 24 Claims



1. A method of establishing a signal path among a collection of signal processing apparatuses (1,2,3,4) via a switching device (5) having a plurality of identical multipin connector positions (6,7,8,9) of identical pin configuration, each of at least two of said collection of apparatuses being connected to said switching device via a different one of said identical connector positions, there being no fixed reservation of connector position for said at least two of said collection of apparatuses, said switching device including a bus (14) for transferring commands among said connector positions and said switching device, said method comprising the steps of:

first generating, by a first apparatus of said collection, a report command for the switching device specifying at least one further apparatus of said collection;

first recognizing by the switching device (5), after reception of said report command, the connector position via which the first apparatus is connected to the switching device;

second generating, after the report command has been supplied to the bus, of an identification signal by said at least one further apparatus which was specified in the report command;

transferring said identification signal to the switching device via a predetermined pin location (17), within said pin configuration, of the connector position via which said further apparatus is connected to said switching device;

second recognizing by the switching device, after reception of said identification signal, the connector position via which said further apparatus is connected to the switching device; and

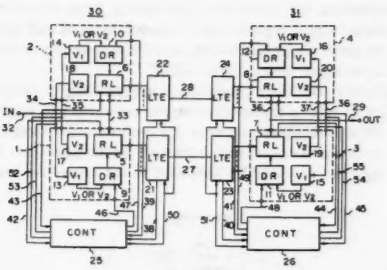
establishing, by the switching device, of a signal path between the connector positions via which said first and further apparatuses are connected to the switching device.

5,073,774

ONE-TO-ONE SWITCHING SYSTEM

Fumihiro Ikawa, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 314,121, Feb. 23, 1989, abandoned.
This application Jan. 3, 1991, Ser. No. 637,991
Claims priority, application Japan, Feb. 23, 1988, 63-40076
Int. Cl.[5] H04Q 9/00; G06F 11/00
U.S. Cl. 340—825.160 10 Claims



1. A one-to-one line switching system including transmitting and receiving parts respectively formed on transmitting and receiving mother boards, the transmitting and receiving parts being interconnected by at least a hot line and a standby line and said transmitting part, in a busy mode, being supplied with and transmitting an input signal over a selected one of the hot and standby lines to the receiving part and comprising:

an input signal line;

a first pair of first and second switching units having a one-to-one correspondence with each other, and each being flexibly and selectively connectable to and removable from the transmitting part mother board, said first and second switching units, when connected to said transmitting part mother board, commonly receiving from said input signal line an input signal to be transmitted, one of said first and second switching units being selectively removable from said transmitting part mother board while the other thereof remains connected to said transmitting part mother board without interrupting transmission of the input signal by said transmitting part during said busy mode thereof;

each of said first and second switching units of said first pair thereof further comprising, in respective associated therewith;

first switching means having associated input means and output means, said respective input means of said first pair of first and second switching units being connected in common to said input signal line for commonly receiving an input signal thereon, when said respective first and second switching units are both connected to the transmitting part mother board, the respective output means of said first pair of said first and second switching units being connected respectively to said hot line and to said standby line, and the respective first switching means of said first pair of said first and second switching units being selectively operable for connecting the respectively associated input means to the respectively associated output means thereof and thereby supplying the input signal as commonly received by the respectively associated input means thereof to the respectively associated output means thereof and thereby, selectively, to the respectively corresponding hot and standby lines, and

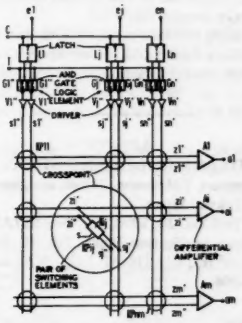
a first switching unit removed state detecting means, operatively connected to the other of said first and second switching units of said first pair thereof when both thereof are connected to transmitting part mother board, and operatively connected to and responsive to the first switching means of said other of said first and second switching units of said first pair thereof for detecting whether the other of said first and second switching units of said first pair thereof has been removed from said transmitting part mother board and, in response to such detection, for actuating said first switching means of said respectively associated one of said first and second switching units of said first pair thereof to connect the associated input means to the associated output means thereof for passing the input signal to the corresponding one of said hot and standby lines.

5,073,775

BROADBAND SIGNAL SWITCHING EQUIPMENT

Ruediger Hofmann, Gilching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 1, 1991, Ser. No. 678,034
Claims priority, application European Pat. Off., Apr. 12, 1990, 90107016
Int. Cl.[5] H04B 3/00
U.S. Cl. 340—825.79 18 Claims



1. Broadband signal switching equipment comprising:

first and second terminals of an operating voltage source carrying first and second potentials, respectively;

a clock line for carrying clock pulses which define a precharge phase and a through-connect phase;

a crosspoint matrix comprising said first and second terminals, said clock line, a plurality of matrix input lines, a plurality of matrix output lines, each of said matrix output lines including first and second conductors, and a plurality of crosspoints interconnecting respective matrix input lines and matrix output lines;

a plurality of output amplifiers each including a differential amplifier comprising a trigger behavior, a first input connected to said first conductor of a respective matrix output line, a second input connected to said second conductor of the respective matrix output line, and an output;

each of said crosspoints comprising first and second switching transistors and first and second input transistors, each of said switching and input transistors comprising first and second main electrodes, and a control electrode;

said control electrode of said input transistors connected to the respective matrix input line;

said control electrode of said switching transistors connected to receive through-connect and inhibit control signals;

said first main electrodes of said first switching and first input transistors connected together to form a first series circuit;

said first main electrodes of said second switching and second input transistors connected together to form a second series circuit;

a plurality of pairs of precharging transistors each including a control electrode connected to said clock line for receiving clock pulses, a first main electrode connected to said

first and second conductors, respectively, of a respective matrix output line, and a second main electrode connected to said first terminal of the operating voltage source, said precharging transistors operable in response to the clock pulses to connect said first and second conductors of the respective matrix output line to the first operating voltage potential so that said conductors are precharged during the precharge phase to at least approximately the first operating voltage potential;

a plurality of shunt transistors each including a control electrode connected to said clock line, and first and second main electrodes connected to said first and second conductors of the respective matrix output line, and operable in response to clock signals to balance the charge on said first and second conductors of the respective matrix output line;

a plurality of logic elements each including an input connected to receive input signals, an output connected to a respective matrix input line, and a control input connected to said clock line, said logic element driven by said clock signals opposite said first and second precharging transistors;

said second main electrodes of said first and second input transistors connected to said second terminal of said operating voltage source; and

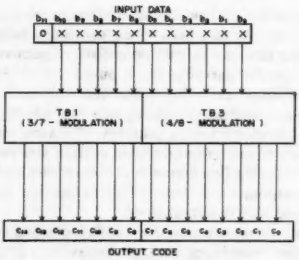
said second main electrodes of said first and second switching transistors connected to respective ones of said first and second conductors of the respective matrix output line.

5,073,776

DATA MODULATING SYSTEM

Toshihiro Shigemori, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 24, 1990, Ser. No. 557,621
Claims priority, application Japan, Jul. 31, 1989, 1-196922
Int. Cl.[5] H03M *7/00, 7/20*
U.S. Cl. 341—106 **9 Claims**



1. A data modulating system comprising:

means for receiving input data composed of 12 bits; and

means for converting the received input data composed of 12 bits to an output code composed of 15 bits such that each of 7 channel bits in the output code composed of 15 bits is set to a code "1".

5,073,777

PLURAL DELTA-SIGMA CONVERTERS OPERATING IN PARALLEL WITH INDEPENDENT DITHER GENERATORS

Kohji Fukuhara, Matsudo, and Yoshio Yamasaki, Tokyo, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 12, 1990, Ser. No. 493,035
Claims priority, application Japan, Mar. 13, 1989, 1-61389
Int. Cl.[5] H03M *1/20*
U.S. Cl. 341—131 **7 Claims**

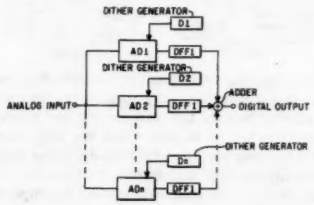
1. A signal conversion system for converting an analog input signal to a digital output signal by employing the delta-sigma modulation technique, said signal conversion system comprising:

input means for receiving an analog input signal to be converted to a digital signal;

a plurality of analog-digital delta-sigma converters connected in parallel to said input means for respectively receiving the analog input signal therefrom at the input of each of said plurality of analog-digital delta-sigma converters;

each said analog-digital delta-sigma converter including a quantizer for converting the analog input signal into a digital signal representative thereof, each of said quantizers producing quantization noise in converting the analog input signal into a digital signal;

a plurality of dither generators corresponding to the plurality of analog-digital delta-sigma converters to provide a respective dither generator for each of said analog-digital delta-sigma converters, each said dither generator utilizing random variables unrelated to the respective random



variables utilized by the other dither generators for producing a dither output signal having a spectrum distribution of noise concentrated in a region of relatively high frequency to define a colored noise signal and being connected to the quantizer of said analog-digital delta-sigma converter corresponding thereto; and

an adder connected in parallel to the outputs of each of said plurality of analog-digital delta-sigma converters for providing an output signal as a digital output signal comprising the added outputs of said plurality of analog-digital delta-sigma converters;

whereby the addition of the colored noise signals produced by the plurality of different dither generators as included in the outputs of said plurality of analog-digital delta-sigma converters effectively averages the quantization noise to provide an approximation of a white noise signal such that an improved dynamic range over a wide frequency band region is achievable for a relatively low frequency region by the signal conversion system.

5,073,778

DIGITAL TO ANALOG CONVERTER WITH DITHER USING TWO PARALLEL PATHS

Masaaki Ueki, Tokyo; Nobuyuki Yasuda, Chiba, and Toshihiko Masuda, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 428,958
Claims priority, application Japan, Nov. 15, 1988, 63-288127
Int. Cl.[5] H03M *1/20*
U.S. Cl. 341—131 **5 Claims**

1. Signal processing apparatus comprising a plurality of signal processing circuits to each of which an input signal is supplied in parallel, each of said signal processing circuits comprising

a dither generator for generating a dither signal,

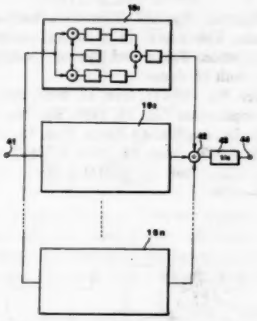
means for forming an addition signal representing a relative addition of said input signal and said dither signal,

means for forming a subtraction signal representing a relative subtraction between said input signal and said dither signal,

a first noise shaping circuit to which said addition signal is supplied,

a second noise shaping circuit to which said subtraction signal is supplied,

first combining means for effectively combining respective components of output signals of said first and second noise shaping circuits, and



second combining means for combining the outputs of said signal processing circuits,

further comprising an n number of said signal processing circuits and gain control means for attenuating the output of said second combining means by 1/n.

5,073,779

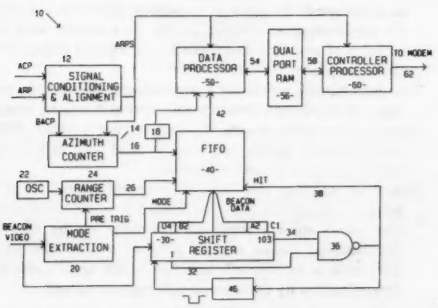
BEACON DATA ACQUISITION AND DISPLAY SYSTEM

David G. Skogmo, Billy D. Black, both of Albuquerque, N. Mex., assignor to Sandia Corporation, Albuquerque, N. Mex.

Filed Aug. 10, 1990, Ser. No. 566,749

Int. Cl.[5] G01S 9/56

U.S. Cl. 342—37 **17 Claims**



1. A system for transmitting aircraft transponder beacon information received by a secondary surveillance radar to a display unit at a remote location from said radar, said radar periodically interrogating beacons through a directional antenna that is swept across a field of view, said beacons transmitting information only when generally aligned with the direction of maximum sensitivity of said antenna, said system including at said radar a digitizer comprising:

input means for receiving input signals from said radar containing information indicating the position of each beacon relative to said antenna and information received by said radar from each beacon;

information retrieval means, connected to said input means, for obtaining digital beacon location and identification information from said input signals;

data processing means for processing said digital beacon information, said means comprising;

means for storing a record for each beacon detected during one sweep of said antenna, each said record containing beacon information including the range of each beacon from said antenna; and

communicator means for transmitting the information of said stored records once for each sweep of said antenna to a remote display, said communicator means comprising:

means for forming a header record setting forth the number of data groups to be transmitted; and

means for forming a plurality of data groups, each group containing the number of beacon records contained in the group, each beacon record containing at least beacon location information; and

means for transmitting the data groups only after receipt of a signal indicating that the header record has been received at said remote display.

5,073,780

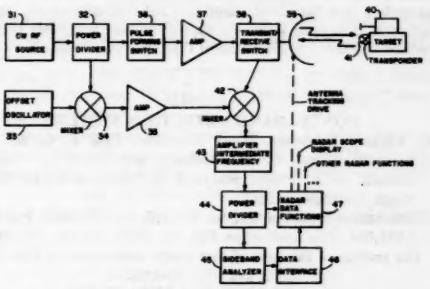
COOPERATIVE PASSIVE IDENTIFICATION SYSTEM FOR MOVING OR STATIONARY OBJECTS

Thomas A. Barley; Pierre M. Alexander, and Gustaf J. Rast, Jr., all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 22, 1982, Ser. No. 458,008

Int. Cl.[5] G01S 13/78, 13/80

U.S. Cl. 342—45 **9 Claims**



1. A method of identifying targets with a radar system, comprising the following steps:

(a) providing each of the targets to be identified with a passive transponder, having at least one vibrating element;

(b) vibrating said vibrating element in a predetermined pattern to provide a signature for its target;

(c) causing said radar system to broadcast a radar signal towards said target;

(d) impinging said radar signal on the surface of said target and said passive transponder vibrating element;

(e) reflecting said radar signal from said target surface and said transponder vibrating element to produce a mixed signal containing reflections of said radar signal from said target and from said vibrating element;

(f) receiving said mixed signal;

(g) processing said mixed signal to separate the signals reflected from said vibrating element from those reflected from said target surface;

(h) analyzing the signals reflected from said vibrating element with a side band analyzer for identifying the signature of said transponder; and

(i) comparing said analyzed signature with known transponder signatures to determine if said target is known.

5,073,781

TRANSPONDER

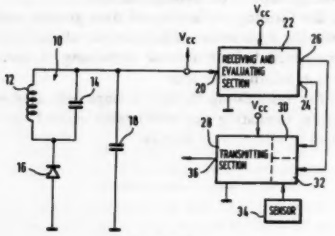
Karl Stickelbrocks, Freising, Fed. Rep. of Germany, assignor to Texas Instruments Deutschland GmbH, Freising, Fed. Rep. of Germany

Filed Jan. 31, 1991, Ser. No. 648,099

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1990, 4002801

Int. Cl.[5] G01S *13/80*

U.S. Cl. 342—51 4 Claims



1. Transponder comprising a receiving and evaluating section and a transmitting section, an energy storage means which is chargeable by an HF interrogation pulse furnished by an interrogation device and furnishes the supply voltage for the receiving and evaluating section and the transmitting section, an identification generator which furnishes identification data fixedly associated therewith and a measurement data generator which receives signals from a sensor and converts them to measurement data, including enabling means connected to provide enabling inputs to the transmitting section for transmitting the identification data only when the supply voltage exceeds a first threshold value and for transmitting the measurement data only when the supply voltage is greater than a second threshold value different than the first threshold value.

5,073,782

CONTRABAND DETECTION SYSTEM

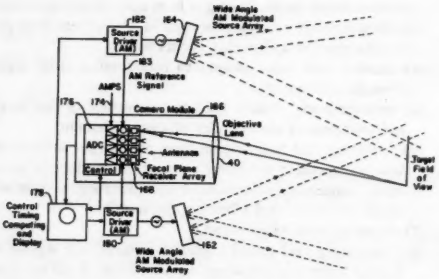
G. Richard Huguenin, South Deerfield; Paul F. Goldsmith, Leverett; Naresh C. Deo, Conway, and David K. Walker, Colrain, all of Mass., assignors to Millitech Corporation, South Deerfield, Mass.

Continuation-in-part of Ser. No. 183,215, Apr. 19, 1988, Pat. No. 4,901,084. This application Dec. 19, 1988, Ser. No. 286,210

The portion of the term of this patent subsequent to Dec. 13, 2007, has been disclaimed.

Int. Cl.[5] G01S *13/89;* H01L *27/146*

U.S. Cl. 342—179 42 Claims



1. A source of radiation for illuminating a field of view with millimeter-wave radiation for contraband detection purposes, comprising:

a two-dimensional array of point sources of polarized radiation, each comprising a millimeter-wave oscillator coupled to radiative antenna elements for emitting polarized millimeter-wave energy toward a field of view, wherein the radiation emitted by all of said sources exhibits a first characteristic polarization, and wherein the oscillators are not constrained to emit radiation in phase with one another, or at the identical frequency, such that the radiation emitted by the array is quasi-coherent.

5,073,783

ANTENNA SYSTEM

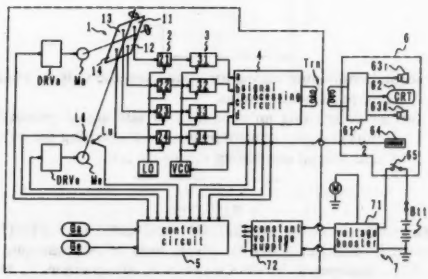
Masahiro Uematsu; Ryuichi Hiratsuka, both of Tokyo, and Kazuro Kato, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo and System Uniques Corporation, Kanagawa, both of, Japan

Division of Ser. No. 449,671, Dec. 12, 1989, Pat. No. 4,994,812. This application Oct. 24, 1990, Ser. No. 602,558

Claims priority, application Japan, Dec. 13, 1988, 63-314541; Jan. 10, 1989, 1-3071; Mar. 24, 1989, 1-72187

Int. Cl.[5] H01Q *3/00*

U.S. Cl. 342—359 1 Claim



1. An antenna system comprising:

first means including a single surface for receiving an electromagnetic wave;

second means including only first and second surfaces for receiving an electromagnetic wave which are disposed on an extension of the surface of said first means for receiving the electromagnetic wave of the first means with the surfaces of said first and second means being disposed on the same plane;

first determining means for determining a phase difference between signals received by said first and second means;

second determining means for determining a phase difference between signals received by said first and second surfaces of said second means; and

means for moving said first and second means so as to achieve a minimum phase difference in an elevation direction based upon a result of determination by the first determinings means and to achieve a minimum phase difference in an azimuth direction based upon a result of determination by the second determining means.

5,073,784

TRANSMITTER LOCATION SYSTEM FOR FREQUENCIES BELOW HF

Wallace D. Westfall, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington

Filed Apr. 26, 1972, Ser. No. 249,443

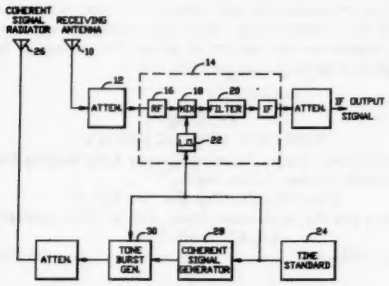
Int. Cl.[5] G01S *3/02*

U.S. Cl. 342—465 2 Claims

2. A method for locating unknown transmitters over great distances at a frequency f below HF comprising the steps of:

receiving signals transmitted by an unknown transmitter at different separated and time-synchronized pairs of local and remote receiver stations;

phase synchronizing each of said pairs to produce zero phase differential when signals are received from a transmitter located equidistant from said local and remote stations; and,



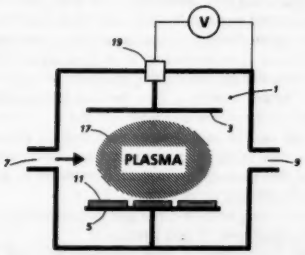
measuring the phase difference between signals received at said stations whereby said phase difference is directly proportional to the cosine of the bearing from the midpoint of a line between said stations to said unknown transmitter.

5,073,785

COATING PROCESSES FOR AN INK JET PRINTHEAD

Frank Jansen, Webster, and Daniel E. Kuhman, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 30, 1990, Ser. No. 516,660
Int. Cl.[5] B41J *2/14*
U.S. Cl. 346—1.1 **18 Claims**



1. A process for minimizing or avoiding drop deflection in ink jet devices which comprises the steps of: coating ink jet head components of said ink jet devices with hydrogenated amorphous carbon and subsequently subjecting said hydrogenated amorphous carbon to fluorination whereby there results a fluorine surface layer present on said hydrogenated amorphous carbon coating thereby preventing drop deflection.

5,073,786

THERMAL HEAD BREAKAGE DETECTING CIRCUIT

Fumihiro Shimada, and Hisashi Uemura, both of Hyogo, Japan, assignors to Kanzaki Paper Mfg. Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1990, Ser. No. 595,519
Claims priority, application Japan, Oct. 31, 1989, 1-285826
Int. Cl.[5] G01D *15/10*
U.S. Cl. 346—76 PH **3 Claims**

1. A detection apparatus for determining whether heating members within a thermal head of a printer are broken, comprising:

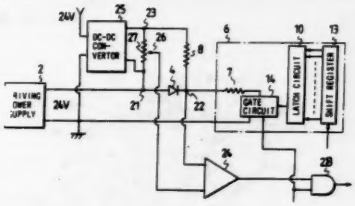
a thermal head;

a driving power supply for delivering power to the thermal head during a printing operation;

a voltage source;

a resistor connected in series to said voltage source;

a diode connected between said driving power supply and said thermal head, said diode being oriented to allow current flow from said driving power supply to said thermal head, wherein said diode is connected in parallel with said resistor and said voltage source, said voltage source



generating an expected voltage drop across said diode when any one of said heating members is broken; and

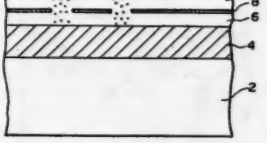
comparator means for comparing a voltage level at an output terminal of said diode with a reference voltage, wherein said comparator means outputs a signal corresponding to whether any of said heating members are broken .

5,073,787

THERMAL RECORDING METHOD, THERMAL RECORDING MEDIUM USED IN THE METHOD AND METHOD FOR PRODUCING THE THERMAL RECORDING MEDIUM

Minoru Fujita; Tadahide Sugimoto, and Yutaka Takagi, all of Tokyo, Japan, assignors to Kyodo Printing Co., Ltd., Tokyo, Japan

PCT No. PCT/JP89/00871, § 371 Date Apr. 27, 1990, § 102(e) Date Apr. 27, 1990, PCT Pub. No. WO90/02046, PCT Pub. Date Mar. 8, 1990
Continuation-in-part of Ser. No. 448,308, Dec. 11, 1989, Pat. No. 4,973,643. This PCT application Aug. 25, 1989, Ser. No. 474,116
Claims priority, application Japan, Aug. 30, 1988, 63-213641
Int. Cl.[5] G01D *9/00*; B41M *5/28*
U.S. Cl. 346—135.1 **5 Claims**



1. A thermal recording medium comprising:

a base;

a magnetic recording layer disposed on said base, said magnetic recording layer serving as a contrast layer;

a first heat-sensitive layer disposed on said magnetic recording layer;

a metallic thin layer disposed on said first heat-sensitive layer;

a second heat-sensitive layer disposed on said metallic thin layer; and

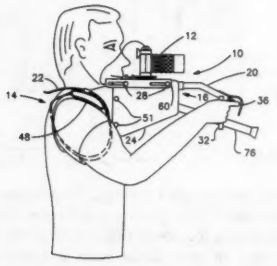
a wear-resistance layer disposed on said second heat-sensitive layer.

5,073,788

CAMERA SUPPORT

David F. Lingwall, 8850 County Rd. 4, North Brainerd, Minn. 56401

Filed Jul. 6, 1990, Ser. No. 549,135
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—81 **18 Claims**



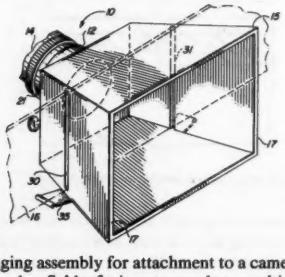
1. A camera support comprising an elongated frame having a shoulder engaging portion at one end and a hand grip at a distal end, means for attaching a camera disposed on said elongated frame between said shoulder engaging portion and said distal end, strap means for securing the elongated frame relative to a user's shoulder while permitting movement of the elongated frame between a suspended at-rest position and a pointing ready to use position, and extendible means attached to said elongated frame, said means for attaching a camera including hinge means for permitting pivotal movement of the camera wherein the camera can be pivoted about said hinge means to be selectively positioned relative to said elongated frame and said extendible means being movable from a stored position to a ground engaging supporting position when said elongated frame is in the pointing position, said extendible means including a tripod with extendible legs, said tripod being pivotally attached to said elongated frame, and releaseable strap means cooperating with a hanger on said elongated frame for securing and supporting the tripod in the stored position.

5,073,789

MEANS AND METHODS FOR CREATING MULTIPLE IMAGES ON A SINGLE FILM FRAME

Ronald M. Mumpower, 27250 N. 64th St., Cave Creek, Ariz. 85331

Filed Nov. 30, 1990, Ser. No. 621,281
Int. Cl.[5] G03B *11/00*
U.S. Cl. 354—122 **11 Claims**



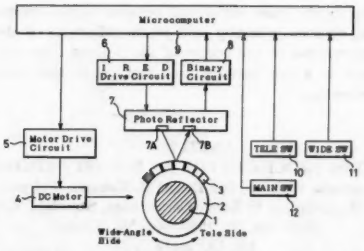
1. An imaging assembly for attachment to a camera having a film plane and a field of view to produce multiple discrete images on a single planar film frame in said film plane without producing double exposures, said assembly comprising: a shield member attachable for controlled rotation relative to a camera and having perimeter walls divergent from said camera outside of said field of view slot means defined in opposite of said perimeter walls in registry with each other and oriented to define a plane substantially parallel to the film frame, each of said slot means having spring means operatively associated therewith, an elongated imager means having a plurality of complementary openings defined therethrough and a plurality of detents corresponding one to each of said openings defined therein and strategically disposed relative to said openings and selectively coactive with said springlock means to selectively position the corresponding one of said openings in said imager means relative to said camera to permit the passage of light through said opening onto said film frame.

5,073,790

POSITION SENSING DEVICE

Kimiaki Ogawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 31, 1990, Ser. No. 531,169
Claims priority, application Japan, Jun. 6, 1989, 1-65924[U]
Int. Cl.[5] G03B *13/00*
U.S. Cl. 354—400 **11 Claims**



1. A device for sensing the position of a moving object, said device comprising:

a pattern provided on a path along which said moving object is moved, said pattern having a pulse generating portion which is periodically and alternatively provided with a first element corresponding to a first logic level and a second element corresponding to a second logic level, said pattern further having a base portion comprising one of said first and second elements having a different length from said one of said first or said second elements provided in said pulse generating portions, said pattern being adapted for movement in two directions in association with said moving object;

means for sensing said base portion and reversing the direction of movement of said pattern;

means for establishing a base position between said base portion and said pulse generating portion of said pattern;

means for sensing said first and said second elements of said pattern; and

means for counting signals output by said sensing means after the establishment of said base position to thereby determine the position of said moving object.

5,073,791

IMAGE FORMING DEVICE

Akihiro Mouri, Atsugi; Masato Katayama, Yokohama; Tetsuro Fukui, Kawasaki; Kazuo Isaka, Tokyo; Shoji Kikuchi, Yokohama, and Noboru Koumura, Narashino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1990, Ser. No. 558,639
Claims priority, application Japan, Jul. 27, 1989, 1-196041
Int. Cl.[5] G03B *27/52*
U.S. Cl. 355—27 **21 Claims**

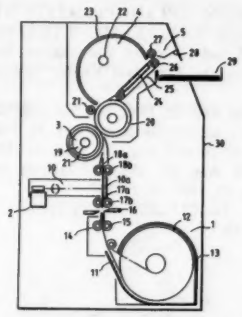
1. An image forming device employing dry process silver salt materials comprising:

(a) a sheet-shaped photosensitive member having a monomer and a photopolymerization initiator on a substrate, a reducing agent, a photosensitive silver halide and an organic silver salt;

(b) a supply means for said photosensitive member;

(c) an irradiation means for irradiating light information on said photosensitive member provided by said supply means;

(d) a heat means for heating said photosensitive member after the irradiation thereof by said irradiation means; and



(e) a uniform exposure means for exposing uniformly said photosensitive member for forming a polymer image on said photosensitive member after said photosensitive member is heated by said heat means.

5,073,792

MACHINE FOR THE CONTINUOUS CONTACT EXPOSURE OF PHOTOSENSITIVE MATERIALS

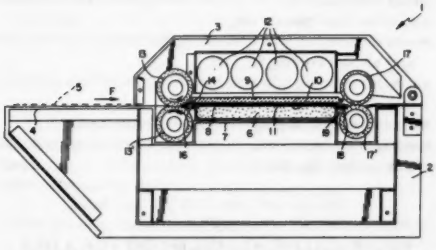
Giuseppe Paccagnella, Via Vigolo 94, Vicenza, Italy 36100

Filed May 24, 1990, Ser. No. 528,188

Claims priority, application Italy, May 24, 1989, 85593 A/89; Jul. 25, 1989, 85624 A/89

Int. Cl.[5] G03B *27/04*

U.S. Cl. 355—97 **20 Claims**



1. A machine for use in continuously exposing laminar photosensitive materials in contact with original films, said machine comprising: a rigid planar plate made of light-transparent material; a flexible supporting and sliding surface having a low coefficient of friction superposed with said rigid planar plate so as to define a planar slit between a surface of said plate which confronts said sliding surface; light-emitting means, arranged beyond said plate to the side thereof opposite that confronting said sliding surface, for irradiating light through said plate; and at least one pair of motorized conveyor rollers provided upstream of an inlet end of said slit for continuously advancing photosensitive materials through said slit; the surface of said plate confronting said sliding surface having a uniform distribution of optically transparent surface discontinuities which are adapted to prevent the formation of a vacuum and to avoid adhesion between said surface of the plate and photosensitive materials to thereby reduce resistance to advancement thereof.

5,073,793

MULTI-COLOR IMAGE FORMING METHOD AND AN APPARATUS THEREFOR

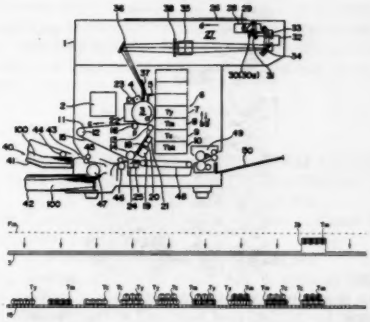
Takao Fujiwara, and Katsuhiko Takeda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 1, 1989, Ser. No. 304,589

Claims priority, application Japan, Feb. 2, 1988, 63-24498

Int. Cl.[5] G03G *15/01, 21/00*

U.S. Cl. 355—202 **10 Claims**



1. An image forming apparatus for making a copy of a document by forming toner images on an image carrier with a plurality of toners of different colors and transferring all of the toner images onto a copying sheet, comprising:

first developing means for accommodating a first toner;

second developing means for accommodating a second toner of a color different from the color of the first toner; and

control means for controlling the first and second developing means so as to bring the first and second developing means into operation in a sequence of the first developing means, then the second developing means and finally the first developing means whereby the second toner is overlapped on the first toner and the first toner is overlapped on the second toner.

5,073,794

IMAGE DUPLICATING APPARATUS IN WHICH USER SPECIFIED OPERATIONAL CONDITIONS ARE STORED AND USED BASED ON THE DETECTED NATURE OF THE DOCUMENT BEING COPIED

Tsuneo Kitagawa, and Kazuhiro Araki, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 199,785, May 27, 1988, abandoned. This application Jan. 3, 1991, Ser. No. 634,965

Claims priority, application Japan, May 30, 1987, 62-137214

Int. Cl.[5] G03G *21/00, 15/04*

U.S. Cl. 355—208 **12 Claims**

1. An image duplicating apparatus comprising:

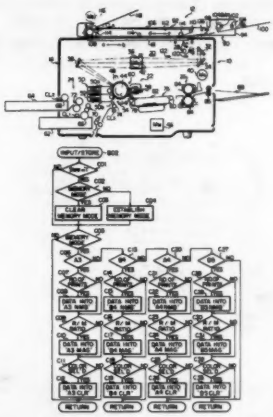
a) detecting means for detecting respective natures of document sheets to be duplicated;

b) input means for entering user modifiable data representative of operational conditions in accordance with which a document sheet having any of said natures is to be duplicated;

c) data storage means for storing the data representative of the respective operational conditions for said natures of document sheets; and

d) copying operation performing means responsive to said detecting means for reading from said storage means the data representative of the respective operation conditions

for the individual natures of document sheets detected by said detecting means, and for performing a copying operation in accordance with the operational conditions represented by the data read from said storage means.



5,073,795

ELECTROPHOTOGRAPHY TYPE IMAGE FORMING APPARATUS HAVING IMPROVED EXCHANGING KIT

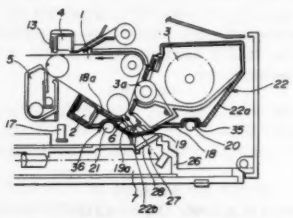
Yasuyuki Nukaya, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 26, 1990, Ser. No. 544,195

Claims priority, application Japan, Jun. 30, 1989, 1-166961

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—210 **11 Claims**



1. An image forming apparatus comprising:

a photosensitive member;

a charger unit provided at a charging station around said photosensitive member for uniformly charging said photosensitive member;

a writing optical system housed in a housing for casting an optical image of a document image onto said photosensitive member, said housing having a projection opening through which a light beam corresponding to the optical image from said writing optical system passes; and

an exchanging kit having a developing unit provided at a developing station around said photosensitive member for developing an electrostatic latent image formed by casting the optical image on said photosensitive member and a dustproof cover integrated with said developing unit and covering said projection opening of said housing of said writing optical system, said dustproof cover having a dustproof glass through which the light beam passing through said projection opening passes, said exchanging kit being detachably provided around said photosensitive member,

wherein said exchanging kit is provided above said writing optical system so that said projection opening of said housing of said writing optical system is positioned under said developing unit, and wherein said writing optical system casts the optical image between said charging station and said developing station on said photosensitive member.

5,073,796

COOLING SYSTEM FOR AN APPARATUS WITH A HEAT GENERATING ELEMENT THEREIN

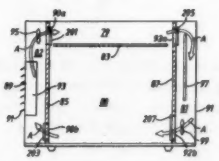
Kensuke Suzuki, and Hiromasa Kohayakawa, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

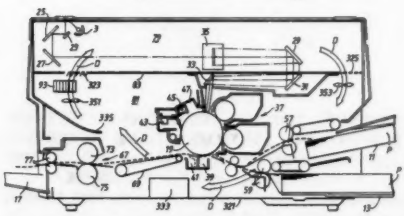
Filed Aug. 31, 1988, Ser. No. 238,782

Claims priority, application Japan, Aug. 31, 1987, 62-215138; Aug. 31, 1987, 62-215142; Aug. 31, 1987, 62-215143; Aug. 31, 1987, 62-215144; Aug. 31, 1987, 62-215145; Aug. 31, 1987, 62-215146; Aug. 31, 1987, 62-215147

Int. Cl.[5] G03G *15/00, 21/00*

U.S. Cl. 355—215 **19 Claims**





1. An apparatus containing an element which generates heat, comprising:

a housing accommodating said element;

means for circulating air in said housing so that said element is in the flow of said air;

means disposed in said flow of air, for absorbing heat from said air and cooling said air;

means for emitting said heat absorbed by said heat absorbing means out of said housing;

means for measuring a predetermined time; and

means for actuating said absorbing means responsive to said time measuring means.

5,073,797

TONER SEALING ARRANGEMENT FOR A DRY DEVELOPING DEVICE OF AN ELECTROSTATIC COPIER

Taizo Ono, Hirakata; Hirotsugu Sakamoto, Ibaraki; Yoshihiro Katayama, Hirakata, and Toshi Saitoh, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

PCT No. PCT/JP88/00301, § 371 Date Jan. 24, 1989, § 102(e) Date Jan. 24, 1989, PCT Pub. No. WO88/07707, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 23, 1988, Ser. No. 294,697

Claims priority, application Japan, Mar. 24, 1987, 62-69333; Apr. 2, 1987, 62-81460; Apr. 17, 1987, 62-95664; Jun. 4, 1987, 62-140285; Dec. 1, 1987, 62-305054; Dec. 8, 1987, 62-309850; Dec. 17, 1987, 62-191627

Int. Cl.[5] G03G *21/00, 15/06*

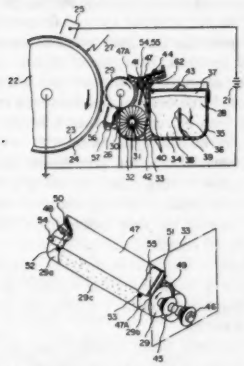
U.S. Cl. 355—215 **4 Claims**

1. A developing apparatus comprising:

an endless-shaped developer carrier;

a supplying means for supplying a developer onto said developer carrier;

a layer thickness controlling member including a blade having an elastic body, for controlling the developer brought into press-contact with said developer carrier on a downstream side from a developer supplying position of said supplying means in a moving direction of said developer carrier to a predetermined layer thickness, said layer thickness controlling member having a surface having at least one edge for press-contacting said developer carrier and having notches for cleaning the developer adhering to



outer peripheral surfaces of said developer carrier, formed on both end surfaces of said layer thickness controlling members contacting said outer peripheral surfaces of said developer carrier;

a first sealing member for cutting off the developer moving to both ends of said developer carrier, said first sealing member for the developer surrounding said outer peripheral surfaces of said both ends of said developer carrier; and

a second sealing member for shielding a junction of said developer carrier, said first sealing member and the layer thickness controlling member.

5,073,798

ELECTRONIC PHOTOGRAPHY APPARATUS

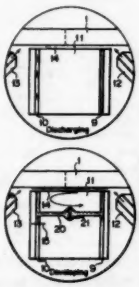
Akira Shirakura; Takao Tsuchiya; Haruo Watanabe, and Koichi Kawasumi, all of Kanagawa, Japan, assignors to Sony Corporation, Shinagawa, Japan

Filed Dec. 11, 1990, Ser. No. 625,886

Claims priority, application Japan, Dec. 13, 1989, 1-323434

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—245 **7 Claims**



1. An electronic photography apparatus comprising:

a) a photoconductor material on which an electrostatic latent image is formed;

b) a developing device for developing said electrostatic latent image formed on said photoconductor material;

c) a developing electrode provided in said developing device and spaced apart from said photoconductor material for developing said electrostatic latent image;

d) means for supplying developers to reside in a spacing between said photoconductor material and said developing electrode; and

e) injection means operating independently of said means for supplying developers for injecting air to the spacing and for removing said developers residing in the spacing between said photoconductor material and said developing electrode.

5,073,799

IMAGE FORMING APPARATUS WHICH ALTERS STAND-BY TEMPERATURE OF THE FIXING DEVICE ACCORDING TO TONER COLOR

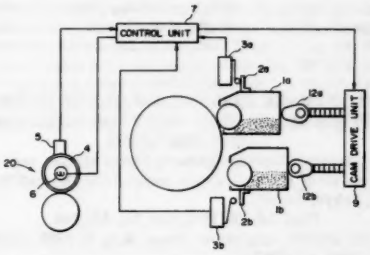
Tsuyoshi Watanabe, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1989, Ser. No. 401,108

Claims priority, application Japan, Sep. 2, 1988, 63-218276

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—285 **8 Claims**



1. An image forming apparatus which can develop a latent image formed on a latent image bearing member with a selected one of a first toner and a second toner different from the first toner, said image forming apparatus comprising:

fixing means for fixing a toner image, said fixing means including a heat member heated by a heat source and contacted with the toner image; and

means for adjusting a temperature difference between a stand-by temperature and a fixing temperature in accordance with the selected toner, wherein the stand-by temperature of the first toner and the stand-by temperature of the second toner are different from each other.

5,073,800

ELECTROPHOTOGRAPHIC APPARATUS WITH MANUAL AND PROGRAMMABLE BLADE CLEANER

Yasuyoshi Yamaguchi, and Susumu Matsuda, both of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed May 3, 1990, Ser. No. 518,653

Claims priority, application Japan, May 11, 1989, 1-117843; May 11, 1989, 1-117845

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—297 **10 Claims**

1. An electrophotographic apparatus, comprising:

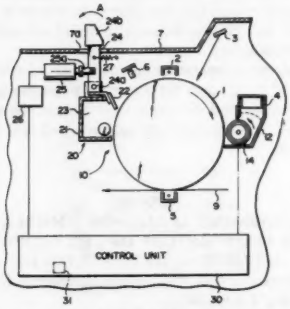
image forming means including an image carrier, for forming an image on a recording medium;

magnetic cleaning means for magnetically cleaning a surface of the image carrier for each cycle of image formation;

mechanical cleaning means for mechanically cleaning the surface of the image carrier, said mechanical cleaning means including a contact member movable between a contact position where the contact member is in contact

with the surface of the image carrier, thereby cleaning the surface, and an off position where the contact member is kept spaced apart from the surface of the image carrier, the contact member normally being in the off position; and

actuating means for selectively moving the contact member from the normally off position to the contact position, said



actuating means including drive means for moving the contact member to the contact position, and control means for actuating the drive means at predetermined time intervals and for predetermined operating time durations, said control means including means for changing said operating time durations when a predetermined number of said time intervals has occurred.

5,073,801

COLOR IMAGE FORMING APPARATUS HAVING DIFFERENT EJECTION PARTS FOR DIFFERENT PAPER THICKNESS

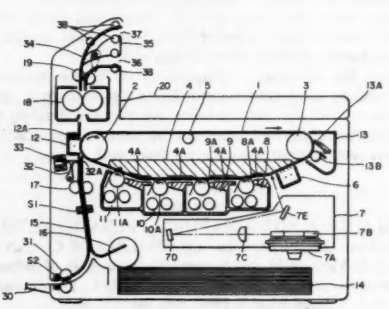
Satoshi Haneda; Masakazu Fukuchi; Shunji Matsuo, and Shizuo Morita, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jul. 26, 1990, Ser. No. 558,768

Claims priority, application Japan, Aug. 9, 1989, 1-207244; Sep. 1, 1989, 1-228097

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—311 **8 Claims**



1. A color image forming apparatus comprising:

an image forming means comprising:

at least two rollers arranged laterally spaced apart;

a belt-shaped image retainer which is trained around said at least two rollers; and

a plurality of developing means provided below said belt-shaped image retainer;

an automatic paper feed unit including means for holding a transverse material, said automatic paper feed unit being in parallel to said image forming means and provided directly below said image forming means;

paper guide means for forming a passage for transporting transfer material from said automatic paper feed unit, said paper guide means including a transfer portion where the transverse material is in contact with said belt-shaped image retainer at one of said at least two rollers, said paper guide means being arranged substantially vertical to said automatic paper feed unit so that the transfer material is transported in an upward direction;

paper ejection means for ejecting the transfer material sent from said paper guide means, said paper ejection means being provided at a position above said image forming means, and said paper ejection means including a plurality of transfer material ejection port means which are selectable according to a thickness of the transfer material;

an ejection tray, provided above said image forming means, in parallel to said image forming means, and arranged for receiving transfer material ejected from said plurality of transfer material ejection port means of said paper ejection means, said ejection ports means of said paper ejection means being arranged relative to said ejection tray such that an ejected transfer material from any of said ejection port means with an image formed thereon is ejected image-face-down on said ejection tray;

said transfer material ejection port means including a first ejection passage having a first radius of curvature, and a second ejection passage having a second radius of curvature, and wherein the first radius of curvature is larger than the second radius of curvature; and

means including at least one of a thickness detecting means for detecting a thickness of a transfer material, and a thickness designating means for designating a thickness of a transfer material;

said transfer material being ejected from the first ejection passage whenever the transfer material is detected or designated to be a thick transfer material, and said transfer material being ejected from the second ejection passage whenever the transfer material is detected or designated to be a thin transfer material.

5,073,802

IMAGE FORMING APPARATUS CAPABLE OF CHANGING IMAGE FORMING MODES DURING CONTINUOUS IMAGE FORMING OPERATION

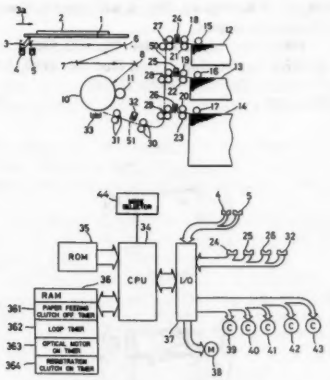
Tsukasa Sugiyama, Moriguchi, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed May 21, 1990, Ser. No. 525,669

Claims priority, application Japan, May 29, 1989, 1-137168

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—313 **8 Claims**



1. An image forming apparatus for forming an image of a document, the image being formed in one of a plurality of image forming modes including a normal image forming mode

in which the image is a substantially exact reproduction of the document, said apparatus comprising:

document scanning means responsive to a start signal for scanning a document;

image forming means for forming an image of the scanned document;

paper feeding means for successively feeding sheets of paper from a paper supply at predetermined time intervals;

means defining a paper delivery passage having a first end adjacent said paper feeding means and a second end adjacent said image forming means, for delivering sheets of paper from said paper feeding means to said image forming means;

registration means in said paper delivery passage for stopping the delivery of the sheets of paper therethrough for a predetermined time;

mode selecting means permitting selecting of one of the plurality of image forming modes;

detecting means for detecting a sheet of paper within said paper delivery passage prior to such sheet of paper passing said registration means;

control means responsive to the selected image forming mode and to detection of a sheet of paper by said detecting means for applying a start signal to said document scanning means at a time following said detection which time is determined in accordance with the selected image forming mode, so that the mode selected by said mode selecting means may be changed while said image forming apparatus is operating, even though one or more sheets of paper are in said paper delivery passage, without collision of sheets of paper within said paper delivery passage; and

image transfer means for transferring an image from said image forming means onto a sheet of paper, delivered thereto from said paper delivery passage, and delivery of the sheet of paper therefrom.

5,073,803

COPYING APPARATUS PROVIDED WITH AN AUTOMATIC DOCUMENT FEEDER AND A SHEET BINDING UNIT

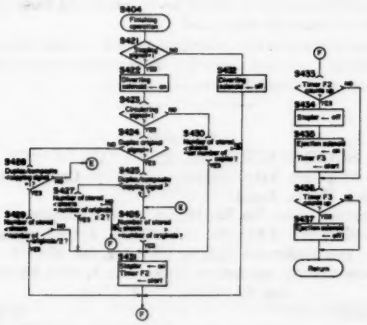
Tomokazu Kato; Syuzi Maruta; Masazumi Ito; Kadotaro Nishimori, and Kimihiko Higashio, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 15, 1989, Ser. No. 451,235

Claims priority, application Japan, Dec. 17, 1988, 63-319292; Nov. 18, 1989, 1-300595

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—324 **3 Claims**



1. A copying apparatus comprising:

means for feeding a plurality of originals one alter another to an exposure section where each original is exposed to light from irradiating means, which is operated either in a first original feeding mode wherein each original is fed to the exposure section with its first side facing the irradiating means or in a second original feeding mode wherein each original is fed to the exposure section with its first side facing the irradiating means and again placed to the exposure section with its second side facing the irradiating means;

means for forming an image of each original fed to the exposure section on a copy sheet, which is operated either in a first copying mode wherein one copy sheet is subjected to one image forming operation or in a second copying mode wherein one copy sheet is subjected to a plurality of image forming operations;

means for selecting the first original feeding mode or the second original feeding mode as the original feeding mode and selecting the first copying mode or the second copying mode as the copying mode;

means for collecting copy sheets and binding them;

means for counting originals placed on the original feed means;

means for setting a standard depending on combination of the original feeding mode with the copying mode; and

control means for inhibiting the operation of the binding means when the value counted by the counting means is over the standard.

5,073,804

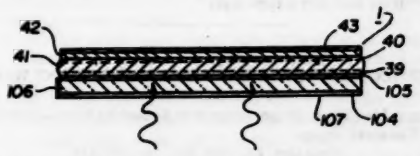
METHOD OF FORMING SEMICONDUCTOR MATERIALS AND BARRIERS

John H. Coleman, Locust Valley, N.Y., assignor to Plasma Physics Corp., Locust Valley, N.Y.

Continuation of Ser. No. 919,595, Oct. 17, 1986, abandoned, which is a continuation of Ser. No. 733,415, May 13, 1985, abandoned, which is a continuation of Ser. No. 355,202, Mar. 5, 1987, abandoned, which is a division of Ser. No. 88,100, Oct. 24, 1979, Pat. No. 4,328,258, which is a division of Ser. No. 857,690, Dec. 5, 1977, Pat. No. 4,226,897. This application Aug. 16, 1988, Ser. No. 232,568

Int. Cl.[5] H01L *31/0392, 31/062, 31/07*

U.S. Cl. 357—6 **4 Claims**



1. A photoresponsive semiconductor device comprising a semiconductor junction comprising in combination:

a body of hydrogenated amorphous silicon and

a substantially transparent tunneling barrier layer of a hydrogenated nitride of silicon on a surface of said hydrogenated amorphous silicon, said tunneling barrier layer having been fabricated by glow discharge in a material selected from the group consisting of ammonia and amines having a hydrogen atom bonded to the nitrogen.

5,073,805

SEMICONDUCTOR LIGHT EMITTING DEVICE INCLUDING A HOLE BARRIER CONTIGUOUS TO AN ACTIVE LAYER

Yoshinori Nomura, and Hitoshi Ogata, both of Hyogo, Japan, assignors to Optoelectronics Technology Research Corporation, Tokyo, Japan

Continuation of Ser. No. 306,605, Feb. 6, 1989, abandoned. This application Feb. 22, 1991, Ser. No. 658,455

Int. Cl.[5] H01L *33/00*

U.S. Cl. 357—17 **5 Claims**

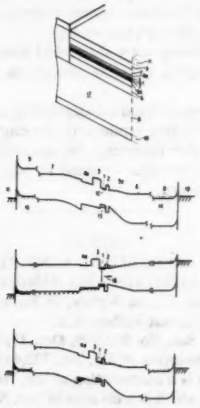
1. A semiconductor light emitting device comprising:

a quantum well which has opposed surfaces and a predetermined band gap and which receives both injected elec-

trons and holes to emit light on recombination of said electrons and said holes;

a p-type layer which is located over one side of said opposed surface to inject the holes into said quantum well and which has a band gap wider than said predetermined band gap of the quantum well;

an n-type layer which is located over the other side of said opposed surfaces to accumulate the free electrons and which has free electron energy states lower than those of the quantum well;



a wide band gap n-type layer brought into contact with the n-type layer on the other side of said opposed surface to inject the electrons into the n-type layer;

a barrier layer which is located between the n-type layer and the quantum well for allowing only the electrons to pass therethrough with the holes interrupted; and

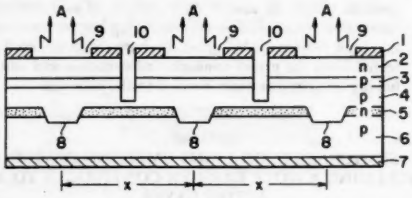
a pair of conductors deposited on said wide band gap n-type layer and said p-type layer.

5,073,806

SEMICONDUCTOR LIGHT EMITTING ELEMENT WITH GROOVES

Yasuo Idei, Tama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1990, Ser. No. 599,230
Claims priority, application Japan, Oct. 17, 1989, 1-269316
Int. Cl.[5] H01L *33/00*
U.S. Cl. 357—17 **2 Claims**



1. A semiconductor light emitting element, comprising:

(a) a double heterojunction structure such that an n-type GaAlAs current restriction layer formed with a conductive region is formed on a p-type GaAs semiconductor substrate, and, furthermore, a p-type GaAlAs cladding layer, a p-type GaAlAs active layer and an n-type GaAlAs cladding layer are formed in sequence on a surface of the current restriction layer in a stacking manner beginning with the p-type cladding layer;

(b) a plurality of conductive regions formed at predetermined intervals in the n-type GaAlAs current restriction layer; and

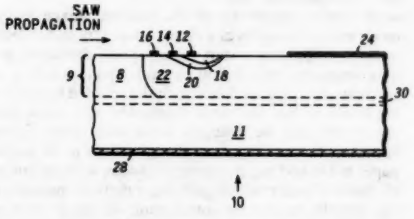
(c) a plurality of grooves formed extending from the surface of the n-type GaAlAs cladding layer through the p-type GaAlAs active layer so as to be located between the two conductive regions, whereby a plurality of monolithic light emitting portions are provided.

5,073,807

METHOD AND APPARATUS FOR ACHIEVING MULTIPLE ACOUSTIC CHARGE TRANSPORT DEVICE INPUT CONTACTS

Frederick M. Fliegel, Tempe; Frederick Y. Cho, Scottsdale, and Fred S. Hickernell, Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 2, 1990, Ser. No. 562,497
Int. Cl.[5] H01L *29/78*
U.S. Cl. 357—24 **13 Claims**



1. A charge transfer device comprising:

a substrate;

channel means for transporting mobile charge, said channel means disposed on said substrate;

a means for clocking said mobile charge through said channel in a predetermined direction, said means for clocking coupled to said channel means;

charge injection means disposed on said channel means, said charge injection means for unidirectionally injecting said mobile charge into said channel means;

charge sensing means disposed on said channel means, said charge sensing means for coupling an output to said mobile charge, said charge sensing means comprising a series of metallic electrodes forming Schottky barrier contacts with said channel means, said electrodes coupled to said channel means, said electrodes are configured such that SAW reflections from one set of electrode edges of said metallic electrodes cancel SAW reflections from another set of electrode edges; and

charge extraction means coupled to said channel means, said charge extraction means for extracting said mobile charge from said channel means.

5,073,808

SOLID STATE SEMICONDUCTOR DEVICE

Takao Kinoshita, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 73,346, Jul. 13, 1987, abandoned, which is a continuation of Ser. No. 656,728, Oct. 1, 1984, abandoned.
This application Jul. 24, 1989, Ser. No. 384,096
Claims priority, application Japan, Oct. 7, 1983, 58-187862
Int. Cl.[5] H01L *27/14, 31/00*
U.S. Cl. 357—30 **48 Claims**

1. A solid state semiconductor device comprising:

(a) a semiconductor substrate;

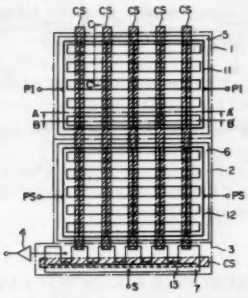
(b) a plurality of photoelectric converting elements formed in said substrate;

(c) an insulating layer disposed on said plurality of photoelectric converting elements

(d) a control electrode having a plurality of portions dis-

posed on said insulating layer and arranged in a first predetermined pattern, said control electrode controlling the transfer of carriers accumulated in said photo-electric converting elements and said control electrode being transparent so as to transmit a light incident thereon to said plurality of photo-electric converting elements; and

(e) wiring means arranged in a second predetermined pattern for short-circuiting a plurality of parts of said control



electrode, said wiring means being disposed directly on said control electrode arranged over said photo-electric converting elements and said insulating layer, wherein the width of said wiring means is narrower than that of said control electrode so that a sufficient amount of the light incident upon said control electrode can be transmitted to said photoelectric converting elements through said control electrode to cause said control electrode to function as a light receiving area.

5,073,809

ELECTRO-OPTIC MODULATION METHOD AND DEVICE USING THE LOW-ENERGY OBLIQUE TRANSITION OF A HIGHLY COUPLED SUPER-GRID

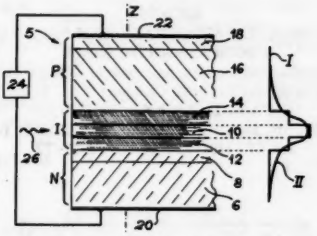
Erwan Bigan, Paris; Michel Allovon, Fontenay, and Paul Voisin, Paris, all of France, assignors to French State Represented by the Minister of Post, Telecommunications and Space (Centre National D'Etudes Des Telecommunications), Issy Les Moulineaux and Centre National De La Recherche Scientifique, Paris, both of, France

Filed Dec. 3, 1990, Ser. No. 620,572

Claims priority, application France, Dec. 1, 1989, 89-15909

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **14 Claims**



1. A method for modulating the intensity of a luminous beam, comprising the steps of:

injecting a luminous beam into an electro-absorbent semiconductive element, wherein the electro-absorbent element includes a tightly coupled super-grid formed of films stacked along a direction constituting a growth direction of the super-grid, wherein the luminous beam is injected into the super-grid parallel to a plane of the films of this super-grid wherein this super-grid is provided to guide the injected luminous beam; and

applying to this semiconductive element an electric field whose amplitude is made to gradually vary so as to vary the intensity of the luminous beam, wherein the electric field is weak and applied along the growth direction of the super-grid, thereby provoking the appearance of a low-energy oblique transition in a domain of wavelengths where the super-grid is transparent in the absence of any electric field, and wherein the super-grid is such that a wavelength of the luminous beam is contained in this domain.

5,073,810

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE AND MANUFACTURING METHOD THEREOF

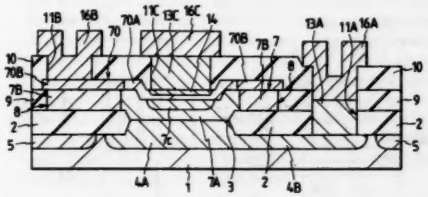
Nobuo Owada, Ohme; Hizuru Yamaguchi, Fussa; Sekiko Ozono, Ozono, and Atsumi Yasuda, Tachikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 19, 1990, Ser. No. 600,363

Claims priority, application Japan, Nov. 7, 1989, 1-289809; Nov. 7, 1989, 1-289810

Int. Cl.[5] H01L *29/72, 29/4, 27/12*

U.S. Cl. 357—34 **7 Claims**



1. A semiconductor integrated circuit device having a bipolar transistor in which a base lead-out electrode is connected to a periphery portion of a base region, comprising:

a semiconductor substrate of a monocrystalline silicon and having a main surface;

an isolation oxide layer selectively formed on said main surface to surround an active region of said main surface; and

a dual layered silicon film having a first silicon film and a second silicon film each formed successively on said active region and on said isolation oxide layer,

wherein the base region of the bipolar transistor is formed in the second silicon film of said dual layered silicon film over said active region and wherein each of said first silicon film and said second silicon film forms over said isolation oxide layer and said first silicon film and said second silicon film form the base lead-out electrode.

5,073,811

INTEGRATABLE POWER TRANSISTOR WITH OPTIMIZATION OF DIRECT SECONDARY BREAKDOWN PHENOMENA

Edoardo Botti, Vigevano, and Aldo Torazzina, Monza, both of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Agrate Brianza, Italy

Filed Jun. 20, 1990, Ser. No. 540,553

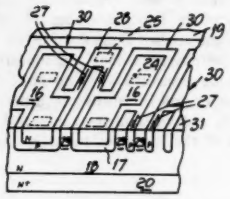
Claims priority, application Italy, Jun. 22, 1989, 20950 A/89

Int. Cl.[5] H01L *29/72, 27/02*

U.S. Cl. 357—34 **6 Claims**

1. Integratable power transistor with optimization of direct secondary breakdown phenomena, comprising a plurality of elementary transistors having a common base terminal, said elementary transistors being arranged side by side and comprising a plurality of adjacent cells, each of which is formed by an emitter region surrounded by base and collector regions,

wherein said base regions of adjacent cells are arranged physically separated from one another and wherein said base regions



are connected by respective resistive elements to said common base terminal.

5,073,812

HETEROJUNCTION BIPOLAR TRANSISTOR

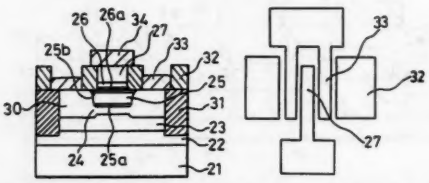
Teruyuki Shimura, Itami, Japan, assignor to Mitubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 20, 1990, Ser. No. 481,619

Claims priority, application Japan, May 11, 1989, 1-118194

Int. Cl.[5] H01L *29/72, 29/161, 23/48, 27/02*

U.S. Cl. 357—34 **13 Claims**



1. A heterojunction bipolar transistor comprising:

a n type semiconductor collector;

a p type semiconductor base layer having generally opposed first and second surfaces, the first surface being disposed on the collector, the base layer forming a heterojunction with the collector;

an n type semiconductor emitter disposed within the base spaced from the first surface and reaching and accessible at the second surface;

a n^+ type InGaAs cap layer disposed on the emitter at the second surface;

a refractory metal emitter electrode disposed on and making ohmic contact to the cap layer without alloying; and

a metal base contact disposed on the second surface electrically contacting the base layer and electrically insulated from the emitter electrode and cap layer.

5,073,813

SEMICONDUCTOR DEVICE HAVING BURIED ELEMENT ISOLATION REGION

Shigeru Morita, Kawasaki; Kikuo Yamabe, Yokohama, both of Japan, and Masakazu Kakumu, Mountain View, Calif., assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 26, 1990, Ser. No. 557,716

Claims priority, application Japan, Jul. 27, 1989, 1-192505

Int. Cl.[5] H01L *27/12*

U.S. Cl. 357—49 **7 Claims**

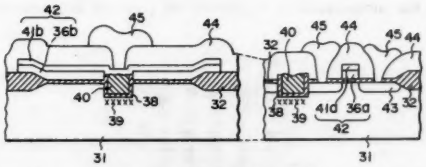
1. A semiconductor device produced by:

forming a first conductive film on a first insulating film formed on a semiconductor substrate,

forming a groove in said first conductive film and said first insulating film, with said groove extending into a portion of said semiconductor substrate,

forming a second insulating film in said groove up to a level between upper and lower surfaces of said first conductive film,

thereafter forming a second conductive film on said first conductive film and said second insulating film,



forming a gate electrode from said second conductive film and said first conductive film, and

forming source and drain regions in a surface region of said semiconductor substrate with each having one end which is adjacent to said gate electrode.

5,073,814

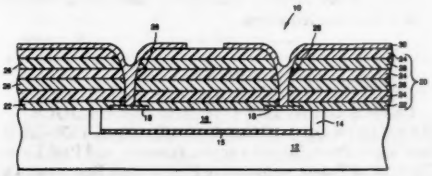
MULTI-SUBLAYER DIELECTRIC LAYERS

Herbert S. Cole, Jr., Scotia, and Yung S. Liu, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 2, 1990, Ser. No. 546,960

Int. Cl.[5] H01L *29/34, 23/48*

U.S. Cl. 357—54 **28 Claims**



1. A dielectric layer comprising a stack of sublayers, said stack comprising:

a plurality of first sublayers consisting of a first dielectric composition which is a polyimide;

a plurality of second sublayers consisting of a second dielectric composition which is a fluorocarbon; and

said first and second sublayers alternating in said stack and being bonded to each other.

5,073,815

SEMICONDUCTOR SUBSTRATE AND METHOD FOR PRODUCING THE SAME

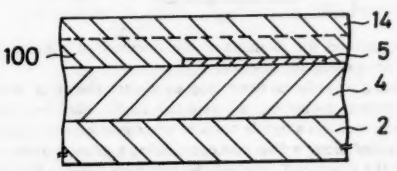
Daisuke Kosaka, Takarazuka, and Junichi Konishi, Ikeda, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 21, 1990, Ser. No. 570,426

Claims priority, application Japan, Aug. 30, 1989, 1-224788

Int. Cl.[5] H01L *29/36, 23/54, 21/22*

U.S. Cl. 357—67 **7 Claims**



1. A semiconductor substrate comprising:

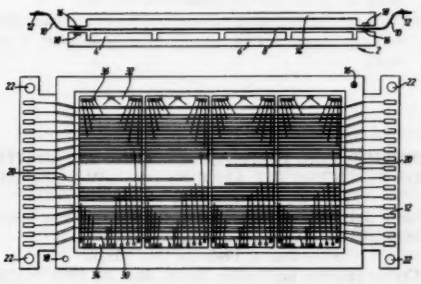
a base plate member made from a dielectric material;
a refractory metal film that covers at least a part of said base plate member;
a single crystal semiconductor film formed on said refractory metal film; and
an impurities diffusion layer formed in said single crystal semiconductor film in a side contacting with said refractory metal film and having a density of impurities gradually decreasing in a direction away from said refractory metal film, so that this impurities diffusion layer comes in ohmic contact with said refractory metal film.

5,073,816

PACKAGING SEMICONDUCTOR CHIPS

Elwyn P. M. Wakefield, Coombe Dingle, and Christopher P. H. Walker, Portishead, both of United Kingdom, assignors to Inmos Limited, United Kingdom

Filed Jul. 25, 1990, Ser. No. 557,940
Claims priority, application United Kingdom, Aug. 14, 1989, 8918482
Int. Cl.[5] H01L *23/06, 23/14*
U.S. Cl. 357—74 **11 Claims**



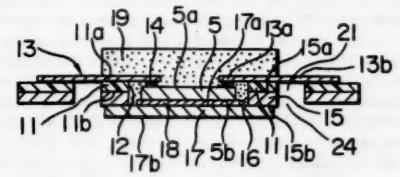
1. A semiconductor device comprising at least one semiconductor chip, the or each semiconductor chip having a plurality of chip bonding pads, a package which encloses the at least one semiconductor chip, a first level interconnect comprising a printed circuit which overlies the at least one semiconductor chip in the package and extends externally of the package to provide a plurality of outer leads, and a second level interconnect comprising means for electrically connecting the chip bonding pads to selected contacts on the printed circuit, which contacts overlie the at least one semiconductor chip.

5,073,817

RESIN ENCAPSULATED SEMICONDUCTOR DEVICE WITH HEAT RADIATOR

Tetsuya Ueda, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 188,471, Apr. 29, 1988, abandoned.
This application Oct. 17, 1990, Ser. No. 598,788
Claims priority, application Japan, Apr. 30, 1987, 62-109327
Int. Cl.[5] H01L *23/40, 23/12, 23/10*
U.S. Cl. 357—81 **10 Claims**



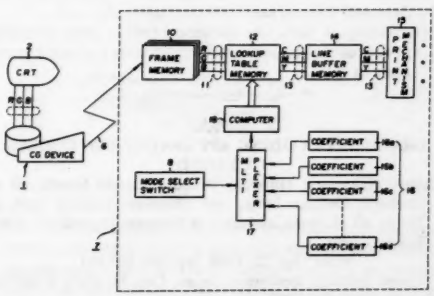
1. A semiconductor device comprising:
a semiconductor chip having opposed first and second surfaces and electrodes disposed on said first surface;
heat radiation means disposed in contact with said second surface of said semiconductor chip;
a metal film having a central opening and a plurality of outer lead holes spaced from and peripherally disposed with respect to the central opening, said metal film being disposed on said heat radiation means, said semiconductor chip being disposed within the central of said metal film and spaced from said metal film;
an electrically insulating synthetic resin film having a central opening and a plurality of outer lead holes spaced from and peripherally disposed with respect to the central opening of said electrically insulating synthetic resin film, said electrically insulating synthetic resin film being disposed on said metal film said semiconductor chip being disposed within the central opening of said electrically insulating synthetic resin film and spaced from said electrically insulating synthetic resin film, the central openings and the outer lead holes of said metal and electrically insulating synthetic resin films being respectively disposed in registration with each other;
a plurality of leads, each lead having first and second ends, the first ends projecting into the central opening of said electrically insulating synthetic resin film and directly contacting respective electrodes on said first surface of said semiconductor chip, the leads being supported intermediate of said first and second ends by the portion of said electrically insulating synthetic resin film lying between the central opening and outer lead holes of said electrically insulating film, electrically insulated from said metal film; and
a resin encapsulating said semiconductor chip and at least part of said metal and electrically insulating synthetic resin films with the second ends of said leads and said heat radiation means exposed outside said resin.

5,073,818

METHOD FOR PROCESSING COLOR IMAGE AND APPARATUS THEREFOR

Tetsuya Iida, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 21, 1988, Ser. No. 287,841
Claims priority, application Japan, Dec. 23, 1987, 62-323818; Dec. 23, 1987, 62-323819; Dec. 23, 1987, 62-323820
Int. Cl.[5] H04N *1/46*
U.S. Cl. 358—80 **14 Claims**



11. An image processing apparatus for converting original color image data input from an input system into desired color image data capable of reproducing a color image by an output system, the apparatus comprising:
first storing means for storing coefficient series in advance;
second storing means for receiving and storing a second coefficient series fit for varying the input image data, the second coefficient transferred from an external apparatus;

selecting means for selecting a desired coefficient series from said coefficient series stored in either said first or said second storing means;

table forming means for improvisatorially forming a look-up table based on said desired coefficient series selected by said selecting means, and

converting means for converting the original color image data into the desired color image data based on said look-up table formed by said table forming means.

5,073,819

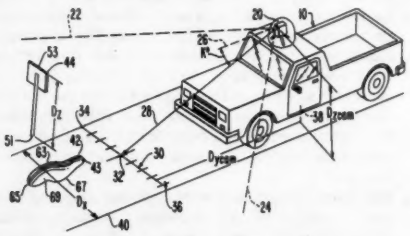
COMPUTER ASSISTED VIDEO SURVEYING AND METHOD THEREOF

Jackson Gates, Kylertown; Robert L. Hawkins, Smithmill; Alan R. Larson, Kylertown; David A. Perove, Altoona, and Michael A. Rudella, Winburne, all of, assignors to Computer Scaled Video Surveys, Inc., Kylertown, Pa.

Filed Apr. 5, 1990, Ser. No. 505,179

Int. Cl.[5] H04N *7/18, 7/00*

U.S. Cl. 358—107 **20 Claims**



1. A method of computer assisted video surveying comprising the steps of:

producing a video recording of a control location, thereby providing a control location video, and of a survey area, thereby providing a survey area video, wherein the control location video includes at least a view of a baseline scale, and storing camera position data associated with said control location;

converting said baseline scale to a video image scale using said control location video;

selecting and displaying a survey video frame image of interest from the survey area video;

identifying one or more points of interest on said survey video frame and a predetermined baseline point obtained from said view of said baseline scale; and,

calculating at least one distance between two identified points based upon said video image scale and said camera position data.

5,073,820

IMAGE DATA CODING APPARATUS AND CODING METHOD

Chihiro Nakagawa; Hiroyuki Fukuda; Hiroshi Sasaki, all of Hachioji; Chikako Mogi, and Hidetoshi Yamada, both of Tokyo, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1990, Ser. No. 602,162

Claims priority, application Japan, Oct. 31, 1989, 1-283761; May 29, 1990, 2-137222

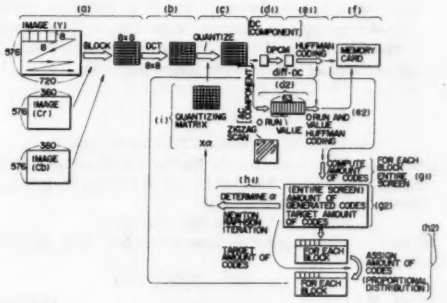
Int. Cl.[5] H04N *7/133, 41/04*

U.S. Cl. 358—133 **13 Claims**

9. A coding method of executing orthogonal transform coding of image data of one screen divided into a plurality of blocks, block by block, and subjecting a transformed output to quantization and entropy coding to code data, said method comprising:

a first step of coding said data lo find out an amount of data for each block required for optimization and an amount of data of one screen;

a second step of assigning an amount of data to each of said blocks and predicting a quantization width needed for optimization;



a third step of performing quantization for said each block using said predicted quantization width; and

a fourth step of executing entropy coding of said each block within a range of said amount of data assigned to said block.

5,073,821

ORTHOGONAL TRANSFORM CODING APPARATUS FOR REDUCING THE AMOUNT OF CODED SIGNALS TO BE PROCESSED AND TRANSMITTED

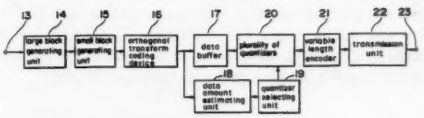
Tatsuro Juri, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 8, 1990, Ser. No. 535,027

Claims priority, application Japan, Jan. 30, 1989, 1-20009; Jun. 9, 1989, 1-147891; Aug. 4, 1989, 1-203285; Jan. 11, 1990, 2-4152

Int. Cl.[5] H04N *7/13*

U.S. Cl. 358—133 **39 Claims**



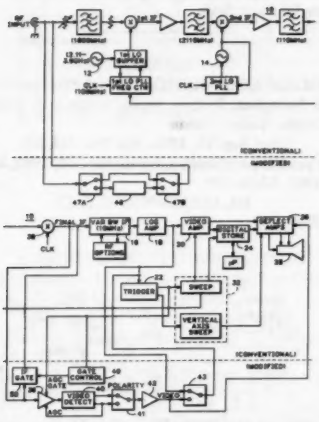
1. An orthogonal transform coding device which comprises: a large block generating means for assembling sample values of input signals to form a large block of the sampled input signals; a small block generating means for dividing said large block formed in said large block generating means into a plurality of small blocks; an orthogonal transform means for orthogonally transforming the signals in each small block; a first quantizing means having a plurality of kinds of quantizers each of which quantizes the orthogonally transformed components provided in said transforming means; a data amount estimating means for calculating an amount of data obtained after the quantizing is effected in said first quantizing means; a selection means for selecting an optimum quantizer in said quantizing means for every small block corresponding to the result of the calculation of the data amount of every small block by the data amount calculating means; a second quantizing means for quantizing the orthogonally transformed component in said large block; a coding means for converting the quantized value obtained in said second quantizing means into variable length coded data; and a transmission means for transmitting said variable length coded data with the information of said selected quantizer.

5,073,822

IN-SERVICE CABLE TELEVISION MEASUREMENTS

Linley F. Gumm, and William Benedict, both of Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 19, 1990, Ser. No. 615,119
Int. Cl.[5] H04N *17/00, 7/10, 7/04*
U.S. Cl. 358—139 12 Claims



1. An apparatus of the type for performing measurements in the frequency domain including means for displaying a frequency spectrum and means for tuning to a desired frequency within the frequency spectrum, the apparatus comprising:

means for generating for the desired frequency a final intermediate frequency signal from an input radio frequency composite television signal having a channel carrier frequency;

means for detecting from the final intermediate frequency signal a composite video signal;

means for generating from the composite video signal a trigger signal for triggering the displaying means during an unmodulated portion of the composite video signal;

means for sampling the composite video signal when the desired frequency is offset from the channel carrier frequency to obtain an average of the amplitude of the composite video signal between sync pulses during the unmodulation portion; and

means for computing from a peak amplitude of the sync pulses, determined when the desired frequency is the channel carrier frequency, and the average of a point midway between two sync pulses within the unmodulated portion a carrier-to-noise ratio for the carrier frequency.

5,073,823

VIDEO LIGHT APPARATUS TURNED-ON SELECTIVELY IN A STANDBY-MODE OF A VIDEO CAMERA

Yukio Yamada, Kanagawa; Akio Furukawa, Saitama, and Kazuki Isono, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 17, 1990, Ser. No. 583,595
Claims priority, application Japan, Sep. 20, 1989, 1-243670
Int. Cl.[5] H04N *5/30*
U.S. Cl. 358—209 5 Claims

1. A video camera apparatus comprising:

a video camera body;

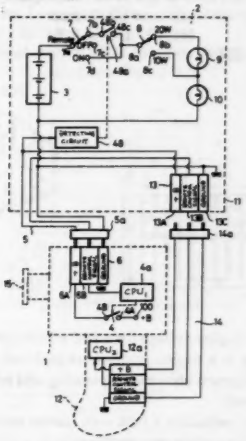
a video light apparatus which is detachably connected to said camera body;

a standby switch arranged in said video camera body for setting a standby mode of said video camera;

a remote control unit which is detachably connected to said video camera body for producing a remote control standby signal;

standby switch control means responsive to said remote control standby signal for actuating said standby switch;

a standby mode detection circuit responsive to said standby switch for detecting said standby mode of said video camera; and



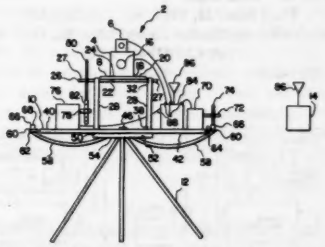
power switching means arranged in said video light apparatus for controlling energization of said video light apparatus in response to said standby detection circuit detecting said standby switch being set in said standby mode.

5,073,824

REMOTE CONTROL AND CAMERA COMBINATION

Gregory D. Vertin, 451 Douglas St., Joliet, Ill. 60435

Filed Jun. 15, 1990, Ser. No. 539,410
Int. Cl.[5] H04N *5/30*
U.S. Cl. 358—210 22 Claims

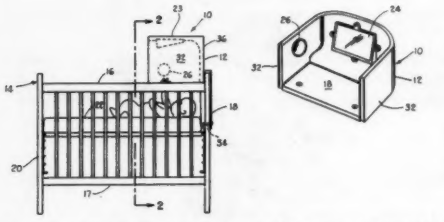


1. A remote control and camera combination comprising a camera, indicating means to indicate a selected point within a viewing area of said camera to a camera operator at a location remote to said camera, said selected point being a known distance and direction from the center of a said viewing area, horizontal movement means to move said camera and said indicating means in tandem in a horizontal direction, vertical movement means to move said camera and said indicating means in tandem in a vertical direction, and remote control means to control said vertical movement means, said horizontal movement means, said indicating means, and said camera from a location remote to said camera.

5,073,825
CONVERTIBLE VISUAL DISPLAY DEVICE

Terry K. Holdredge, and Susan S. Holdredge, both of 1303 Hanover Rd., Anderson, S.C. 29621

Continuation of Ser. No. 34,691, Apr. 6, 1987, Pat. No. 4,939,582. This application Jun. 21, 1990, Ser. No. 541,512
The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.
Int. Cl.[5] H04N *5/64*
U.S. Cl. 358—254 **14 Claims**

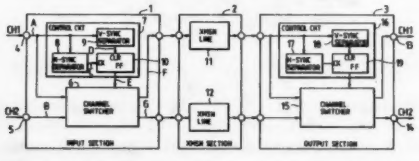


1. A visual display system for a bed which can be viewed by a person lying in a supine position on said bed comprising:
- a canopy disposed above and spanning said bed adjacent one end thereof;
- said canopy including a first wall means and a second wall means intersecting one another;
- a visual display unit carried by said first wall means having a display screen for viewing by said person in said supine position;
- mounting means for carrying said visual display unit in a viewing position on said first wall means with an image on said display screen being oriented in the same direction as said person lying below said canopy in said supine position; and
- support means supporting said canopy above said bed with said display screen disposed in said viewing position generally overhead of said person in said supine position.

5,073,826
VIDEO SIGNAL TRANSMISSION APPARATUS FOR FRAMES WITH AN ODD NUMBER OF LINES

Tsutomu Muraji, Nara; Akihiro Takeuchi, Ikoma, and Atsuo Ochi, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 21, 1989, Ser. No. 326,834
Claims priority, application Japan, Mar. 22, 1988, 63-68551
Int. Cl.[5] H04N *5/76*
U.S. Cl. 358—335 **18 Claims**

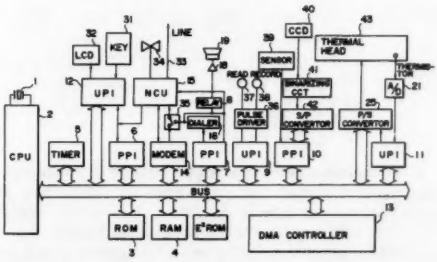


1. A video signal transmission apparatus comprising:
- first switching means for periodically and mutually switching two-channel signals at periods of nH and thereby generating two converted signals which correspond periodically and alternately to the two-channel signals at periods of nH, wherein the two-channel signals contain video information defining a video signal in a video system where one frame is composed of an odd number of lines, and wherein the character "nH" denotes a value which equals a preset integer "n" times a horizontal sync period "H";
- first resetting means for resetting the first switching means for each field in the frame;
- means for transmitting the two converted signals;
- second switching means for periodically and mutually switching the two converted signals, which are transmitted by the transmitting means, at periods of nH and thereby reobtaining two-channel signals from the two converted signals; and
- second resetting means for resetting the second switching means for each field.

5,073,827
IMAGE COMMUNICATION APPARATUS

Toshifumi Nakajima, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,305
Claims priority, application Japan, Sep. 22, 1987, 62-239473; Sep. 29, 1987, 62-247599
Int. Cl.[5] H04N *1/00, 1/32*
U.S. Cl. 358—437 **11 Claims**



1. An image communication apparatus comprising:
- memory means for storing image data;
- transmitting means for performing transmission of the image data;
- means for receiving the image data and storing the received image data in said memory means;
- recording means for recording the image data in said memory means;
- means for instructing image data transmission from said transmitting means; and
- control means for temporarily interrupting a recording operation of said recording means in response to an instruction from said instructing means during recording of said recording means and for operating said transmitting means, wherein said control means restarts the interrupted recording operation at the end of transmission by said transmitting means.

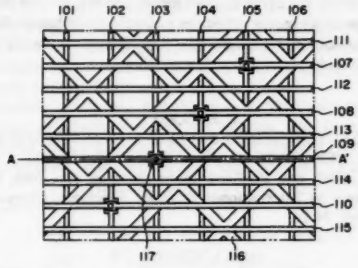
5,073,828
PHOTOELECTRIC CONVERSION DEVICE

Katsuhiko Yamada, Atsugi; Katsunori Hatanaka, Yokohama; Toshihiro Saika, and Takayuki Ishii, both of Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 209,960, Jun. 22, 1988, abandoned. This application Jun. 26, 1990, Ser. No. 544,068
Claims priority, application Japan, Jun. 26, 1987, 62-160510
Int. Cl.[5] H04M *1/04*
U.S. Cl. 358—482 **14 Claims**

1. A photoelectric conversion device comprising:
- plural photoelectric conversion elements arranged in a linear array, wherein each of the photoelectric conversion elements has an individual output electrode;
- plural common lines each connecting at least two of said individual output electrodes of said plural photoelectric conversion elements;
- a conductor layer provided at least at an unconnected cross-

over point between said individual output electrodes and said common lines; and



wirings connecting said conductor layer to other conductor layers.

5,073,829

CASSETTE SUPPLY APPARATUS

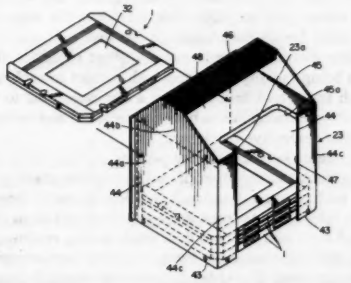
Tsuyoshi Katsuta, and Yasuhito Shiraishi, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 30, 1990, Ser. No. 575,418

Claims priority, application Japan, Sep. 5, 1989, 1-228218; Jul. 26, 1990, 2-196150

Int. Cl.[5] H04N *1/04*

U.S. Cl. 358—498 **8 Claims**



1. A cassette supply apparatus for supplying a plurality of cassettes, each of which holds a document in a flat state, one by one, in sequence, to an image reading apparatus for reading said documents and converting said documents to electrical signals, said apparatus comprising:

a cassette holding stacker, adapted to hold said plurality of cassettes stacked, one directly upon the other in a vertical direction,

discriminating means for discriminating a position of an uppermost cassette stacked in said stacker,

an elevator for moving said cassette holding stacker in said vertical direction,

cassette supply means for removing a lowermost cassette from said stacker and supplying the removed cassette to said image reading apparatus through a cassette supply port,

cassette return means for removing a cassette from said image reading apparatus through a cassette discharge port and returning the discharged cassette to said stacker and,

an elevator control means for controlling said elevator so that, when a cassette is to be supplied to said image reading apparatus, said lowermost cassette stored in said stacker is coincident in height with said cassette supply port and, when a cassette is returned to the stack through said cassette discharge port, the uppermost position in said stacker is coincident in height with said discharge port,

when said lowermost cassette is removed from said stacker the cassettes remaining in the stacker are lowered by gravitational force so that the cassette which had been stacked directly upon the removed cassette drops to the lowermost position in the stacker.

5,073,830

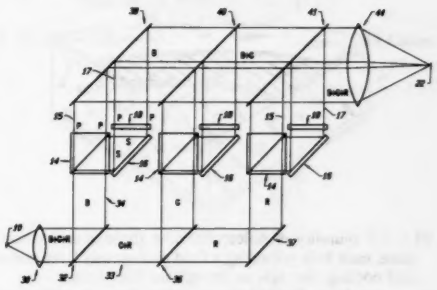
HIGH-EFFICIENCY POLARIZED LIGHT SOURCE

Bryan E. Loucks, Los Altos Hills, Calif., assignor to Greyhawk Systems, Inc., Milpitas, Calif.

Filed Jan. 9, 1990, Ser. No. 462,416

Int. Cl.[5] G02B *27/28*

U.S. Cl. 359—495 **3 Claims**



1. A polarization system consisting of:

a light source;

collimating means for aligning light from said light source into a first beam consisting of substantially parallel light rays;

first splitting means for splitting said first beam into a first plurality of beams, each of said first plurality of beams having a substantially different wavelength band;

a pluraiity of second splitting means for splitting said first plurality of beams into a second and third plurality of beams, said second and third pluralities of beams having substantially perpendicular polarization states;

a plurality of retarding means for changing the polarization of said second plurality of beams such that said second and third pluralities of beams consist of substantially parallel polarization states;

a plurality of linearly aligned reflecting means for aligning said second and third plurality of beams to be substantially parallel;

recombining means for combining said second plurality of beams into a single second beam and said third plurality of beams into a single third beam, said second beam and said third beam oriented in a substantially parallel manner; and

imaging means for focusing said second and third beams, thereby creating an image with substantially a single polarization, said image being suitable for input to an optical system requiring polarized light.

5,073,831

COOLED TRANSMISSIVE MIRRORS, BEAM SPLITTERS, WINDOWS, AND REFRACTIVE ELEMENTS FOR HIGH-POWER APPLICATIONS

Graham W. Flint, Albuquerque, N. Mex., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed May 3, 1989, Ser. No. 347,265

Int. Cl.[5] G02B *5/08*

U.S. Cl. 359—845 **26 Claims**

20. An optical element comprising:

(a) a thin, substantially transparent face plate having a coating which is at least partially reflective;

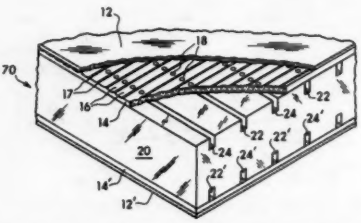
(b) a thin, substantially transparent second plate immediately behind said face plate having a surface and a plurality of shallow cooling channels extending substantially in paral-

lel across said surface of said second plate behind said face plate;

(c) a substantially transparent substrate immediately behind said second plate;

(d) a plurality of inlet ducts extending substantially in parallel across said substrate immediately behind said second plate in a direction substantially perpendicular to said cooling channels;

(e) a plurality of exhaust ducts extending substantially in parallel to each other and to said inlet ducts across said substrate immediately behind said second plate in alternating arrangement with said inlet ducts;



(f) a first plurality of holes extending through said second plate, each hole providing a fluid passageway from one of said cooling channels to one of said inlet ducts;

(g) a second plurality of holes extending through said second plate, each hole providing a fluid passageway from one of said cooling channels to one of said exhaust ducts; and

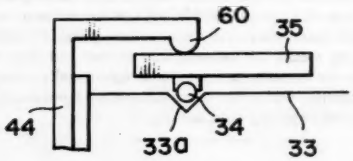
(h) a fluid coolant circulating into said inlet ducts, through said cooling channels, and out said exhaust ducts; wherein the refractive index of said coolant fluid substantially matches the refractive indices of said substrate, said face plate, and said second plate for at least one predetermined wavelength.

5,073,832

CARRIAGE CONTROLLING APPARATUS FOR FLOPPY DISK APPARATUS

Kunio Ohashi, Shizuoka, and Kunihiko Matsumoto, Fuji, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 23, 1989, Ser. No. 370,709
Claims priority, application Japan, Jun. 24, 1988, 63-156535
Int. Cl.[5] G11B *5/56*
U.S. Cl. 360—75 **14 Claims**



1. A carriage controlling apparatus for a floppy disk apparatus, comprising:

carriage means having a magnetic head mounted thereon and driven by a stepping motor so as to allow the magnetic head to seek a desired position in a radial direction of a recording medium;

carriage driving means including a lead screw which is rotated by the stepping motor and a motion transmitting member which is engaged with a groove formed on a surface of the lead screw so as to convert the rotation of the lead screw into a linear motion which is transmitted to the carriage means so as to move the carriage means in the radial direction of the recording medium; and

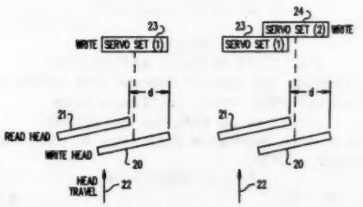
drive control means, including lead screw stopper means mounted to the lead screw and serving to stop the rotation of the lead screw at a predetermined track position on an innermost side of the recording medium when the carriage means is moved toward an inner region of the recording medium, the drive control means serving to stop the carriage drive means when the magnetic head has performed its seeking to a predetermined track position on the innermost side of the recording medium.

5,073,833

DUAL SECTOR SERVO SYSTEM FOR DISK FILE WITH SEPARATE READ AND WRITE HEADS

John S. Best, and Po-Kang Wang, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,152
Int. Cl.[5] G11B *5/596*
U.S. Cl. 360—77.05 **20 Claims**



1. A method for compensating for misalignment of separate but linked read and write heads when reading and writing data on data tracks on a magnetic disk, including the steps of:

generating for all data tracks on the disk two sets of servo information at circumferentially offset positions, the two sets being radially displaced with respect to each other at each respective data track by a distance equal to the respective misalignments between the read and write heads at that respective track; and

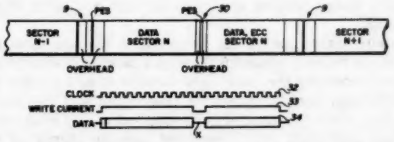
using one of said sets during writing of data on a selected data track and the other of said sets during reading of data on said selected data track to align the write head over said selected data track during writing and align the read head over said selected data track during reading of data on said selected data track, thereby compensating for misalignment of said heads with said selected data track.

5,073,834

DISK FILE OR TAPE DRIVE WITH HIGH SERVO SAMPLE RATE EMBEDDING ADDITIONAL SERVO SECTORS WITHIN INDIVIDUAL DATA SECTORS

John S. Best, San Jose; Steven R. Hetzler, Sunnyvale; William J. Kubelac, Morgan Hill, and David A. Thompson, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 17, 1990, Ser. No. 466,195
Int. Cl.[5] G11B *5/596*
U.S. Cl. 360—77.08 **17 Claims**



9. A recording medium, characterized in that tracks on the medium are formatted into a plurality of maxi sections, each containing a servo field and an associated synchronization field and a data field, and all maxi sections on a respective track are of equal length, and at least one micro servo section within each of said data fields contains a resynchronization field

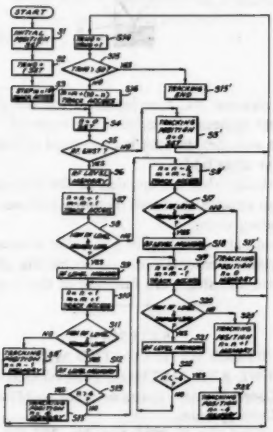
which is shorter than the synchronization field and contains only a subset of the information in the synchronization field.

5,073,835

HEAD TRACKING SYSTEM WITH MEMORY FOR STORING CORRECT TRACKING POSITIONS

Kohichi Sano, and Toshitada Hayashi, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 433,434, Nov. 8, 1989, abandoned, which is a continuation of Ser. No. 108,016, Oct. 14, 1987, abandoned. This application Dec. 3, 1990, Ser. No. 622,220
Claims priority, application Japan, Oct. 17, 1986, 61-246946
Int. Cl.[5] G11B 5/596
U.S. Cl. 360—77.04 **3 Claims**



1. Tracking control apparatus for a device for reproducing signals recorded on a rotating disk having a plurality of concentric tracks with a known mechanical center recorded thereon, said tracking control apparatus comprising:

transducer means for reproducing signals from each of said tracks;

transducer positioning means for radially positioning said transducer means to a respective mechanical center of each successive one of said plurality of tracks on said disk and positioning said transducer radially from the mechanical center of each track by an incremental step substantially less than a track width, whereby said transducer means sequentially reproduces signals from at least two locations in each of said plurality of tracks;

detector means for detecting levels of the signals sequentially reproduced by said transducer means from at least two locations in each of said tracks;

means for comparing a detected signal level at said mechanical center position with a signal level at an incremental step position and sequentially determining a deviation from said mechanical center position for each successive track based on a highest detected signal level;

memory means for storing said deviation for each successive track from said means for comparing as said detector means sequentially detects signals of maximum level for each successive one of said plurality of tracks; and

means for receiving a track designation signal designating a selected track for reproduction and for connecting said track designation signal to said transducer positioning means and to said memory means,

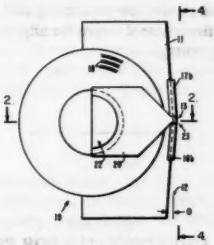
wherein following said determining said deviation for each successive one of said plurality of tracks and storing each said deviation in said memory means and upon receiving said track designation signal said transducer positioning means is responsive to said known mechanical center and said deviation from said known mechanical center from said memory means and said track designation signal for sliding the transducer means to said selected track.

5,073,836

SINGLE POLE WRITE AND A DIFFERENTIAL MAGNETO-RESISTIVE READ FOR PERPENDICULAR RECORDING

Hardayal S. Gill, Los Altos, and Victor W. Hesterman, Los Altos Hills, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 5, 1989, Ser. No. 417,374
Int. Cl.[5] G11B 5/39
U.S. Cl. 360—113 **19 Claims**



1. A head structure for reading and writing perpendicular transitions from and to a moving recording medium, said structure comprising:

an auxiliary magnetic pole member;

a planarized first layer of nonmagnetic insulating material disposed on the auxiliary pole member;

a magnetoresistive gradiometer adapted to read from the moving recording medium and formed on the planarized first layer of insulating material adjacent one edge of the auxiliary magnetic pole member comprising an air bearing surface;

a second layer of nonmagnetic insulating material disposed on the first layer of insulating material and on the gradiometer to encapsulate the gradiometer;

a layer of photoresist material disposed on the second layer of insulating material; and

a coil encapsulated in the layer of photoresist material;

a primary magnetic pole member disposed on the layer of photoresist material and having a portion thereof tapering toward one edge thereof adjacent the air bearing surface, the primary and auxiliary magnetic pole members being adapted to write to the moving recording medium.

5,073,837

LOW VOLTAGE PROTECTION CIRCUIT

Hoon-Kee Baek, Taegu, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Kyung Ki, Rep. of Korea

Filed Aug. 10, 1989, Ser. No. 391,990
Int. Cl.[5] H02H 3/24; H02J 7/04
U.S. Cl. 361—92 **22 Claims**

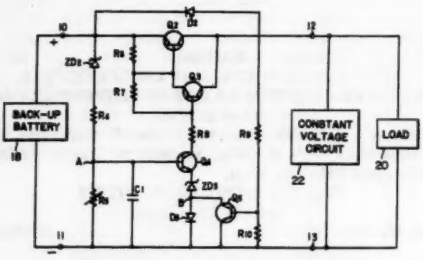
1. A low voltage protection circuit for preventing overdischarging of a back-up battery, said circuit comprising:

switching means, for supplying a first voltage to a load, connected in series between said battery and load;

charging means, for charging said battery with a second voltage, connected in parallel with aid switching means;

first control means, for determining different operation starting and operation-terminating voltages of said battery while said second voltage is off and controlling "on" and

"off" of said switching means; connected in parallel with said battery; and



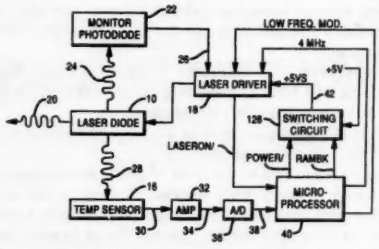
second control means, for generating and supplying a voltage to said first control means for adjusting the operation-terminating voltage.

5,073,838

METHOD AND APPARATUS FOR PREVENTING DAMAGE TO A TEMPERATURE-SENSITIVE SEMICONDUCTOR DEVICE

Stephen J. Ames, Trumansburg, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 4, 1989, Ser. No. 445,225
Int. Cl.[5] H01S *3/00*
U.S. Cl. 361—103 **28 Claims**



1. A thermal monitor for a temperature-sensitive semiconductor device, comprising:

a heat sink operatively associated with said semiconductor device;

driving means for driving said semiconductor device;

control means for controlling the operation of said driving means;

temperature sensor means mounted in operative relation to said heat sink and capable of providing an analog electrical signal representative of the temperature sensed;

analog-to-digital converter means coupled to said temperature sensor means for converting the analog signal to a digital value; and

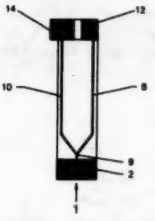
microprocessor means coupled to said analog-to-digital converter means and capable of selecting a proper duty cycle for operation of said semiconductor device, depending upon the temperature of said semiconductor device as given by said digital value, said microprocessor means being coupled to said control means to control said control means to cause said driving means to be operated in accordance with the selected duty cycle.

5,073,839

DUAL AC FUSE, A FUSE HOLDER AND A METHOD FOR: SIMULTANEOUS SELECTION OF FUSING ELEMENT AND LINE VOLTAGE

H. C. Yallon, 13432 Whispering Hills Dr., Dallas, Tex. 75243

Filed Jul. 27, 1989, Ser. No. 385,390
Int. Cl.[5] H02H *5/04*
U.S. Cl. 361—104 **1 Claim**



1. A dual element AC fuse intended for the protection of equipment and systems intended to operate on 115VAC or 250VAC line voltage, the fuse is composed of the following:

(a) a tubular glass body;

(b) two end caps that are epoxied to the tube ending;

(c) a top cap consisting of two metallic sections separated by an insulating strip;

(d) a bottom cap consisting of a metallic substance;

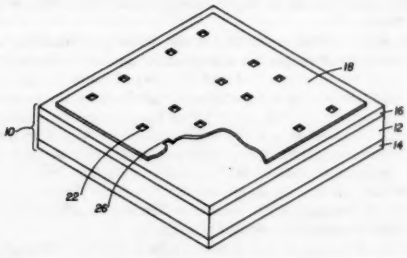
(e) two metallic elements enclosed within the glass body and whose size and shape are function of the fuse rating.

5,073,840

CIRCUIT BOARD WITH COATED METAL SUPPORT STRUCTURE AND METHOD FOR MAKING SAME

William G. Coors, Golden, Colo., assignor to Microlithics Corporation, Golden, Colo.

Filed Oct. 6, 1988, Ser. No. 254,494
Int. Cl.[5] H05K *7/02*
U.S. Cl. 361—400 **69 Claims**



1. A support structure for supporting at least one circuitry component having an effective linear coefficient of thermal expansion, the support structure comprising:

an electrically conductive substrate comprising molybdenum and copper having first and second major surfaces and having a linear coefficient of thermal expansion substantially matched to the effective linear coefficient of thermal expansion of a circuitry component to be supported by the support structure;

a thick film layer of dielectric material covering at least a portion of said electrically conductive substrate for supporting a circuitry component, said dielectric material having at least one void for accommodating electrical connection therethrough between electrical contact means of a circuitry component to be supported by the support structure and said electrically conductive substrate, and having a linear coefficient of thermal expansion

substantially matched to said effective linear coefficient of thermal expansion of said electrically conductive substrate; and

at least one electrical interconnect means electrically connected to said electrically conductive substrate and disposed at lest partially within said at least one void for electrically connecting electrical contact means of a circuitry component to be supported by the support structure and said electrically conductive substrate.

5,073,841

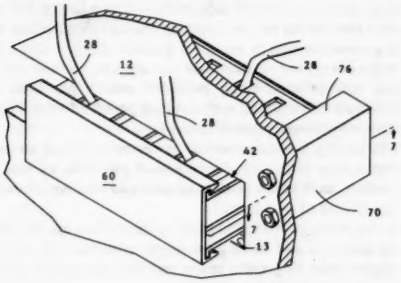
WIRE MANAGEMENT SYSTEM

Henry L. DelGuidice; George H. Foster, Jr., both of Winston-Salem, and Michael G. Warren, North Wilkesboro, all of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 7, 1990, Ser. No. 476,202

Int. Cl.[5] H02B *1/20*

U.S. Cl. 361—428 **2 Claims**



1. A wire management panel comprising:

a panel section having a through opening therethrough;

bracket means adapted to be secured to the panel section adjacent to the opening; and

channel means assembled to the bracket means and installed through the opening, the channel means including a plurality of resilient flexible fingers defining a plurality of slots therebetween, said slots providing access to the channel internal passageway, the channel means being retractably moveable from a position adjacent to the panel, where cables can be inserted into the passageway from the rear of the panel section, to a retracted position where cables can be inserted into the channel internal passageway from the front of the panel section.

5,073,842

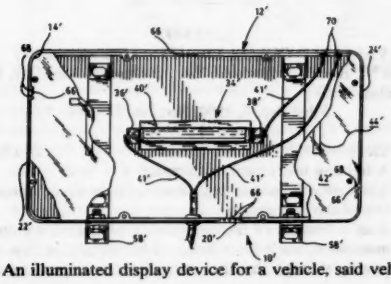
ANTI-THEFT ILLUMINATED DISPLAY DEVICE

Gary W. Monroe, 6415 Old Maynardville Hwy., #1, Knoxville, Tenn. 37918

Filed Jan. 25, 1990, Ser. No. 470,832

Int. Cl.[5] B60Q *1/56*

U.S. Cl. 362—83.2 **12 Claims**



1. An illuminated display device for a vehicle, said vehicle including a license plate support structure, said display device comprising:

a lamp housing for being secured to said license plate support structure in lieu of a license plate, said housing having a rear wall for engaging said license plate support structure and defining a forwardly disposed opening, said housing also including a lower portion provided with license plate support means for engaging and supporting a license plate below said opening, said license plate support means including at least one license plate engaging bracket incorporating a hinge whereby a license plate is pivotally secured to said lower portion of said lamp housing, said lower portion defining at least one light aperture;

a display panel for covering said opening of said lamp housing, at least a portion of said display panel being translucent;

at least one lamp mounted within said lamp housing for illuminating said display panel and for emitting light through said light aperture to illuminate a license plate secured to said license plate support means whereby said display panel and said license plate can be simultaneously supported, displayed and illuminated by said display device.

5,073,843

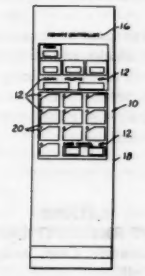
PHOSPHORESCENT KEY PAD

Vera C. Magee, 5165 Iroquois, Detroit, Mich. 48213

Filed Oct. 31, 1990, Ser. No. 606,556

Int. Cl.[5] F21V *9/16*

U.S. Cl. 362—84 **1 Claim**



1. A key pad illumination kit for a key pad, the key pad comprising a plurality of keys for being selectively pressed by a user, each key of the key pad having informational indicia for indicating to the user functionality information of that respective key of said plurality of keys, said key pad illumination kit comprising:

a backing material;

a plurality of individual informational indicia units, each informational indicia unit of said plurality of informational indicia units having a first side and a second side, said first side of each said informational indicia unit having an indicia thereon corresponding to the informational indicia of a respective key on the key pad, said informational indicia units having a phosphorescent property which illuminates said indicia in darkened environments, said second side of said informational indicia units having an adhesive backing, each second side of said informational indicia unit being releasably attached to said backing material;

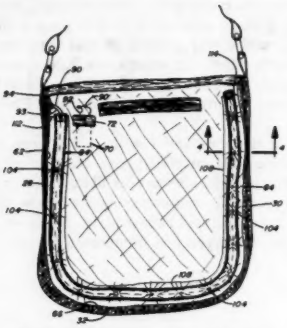
wherein a selected informational indicia unit may be removed from said backing material and placed upon the key pad adjacent the respective key thereof in order that the phosphorescence of the informational indicia unit in combination with the indicia thereon informs the user of the function indicia of the respective key in darkened environments of use.

5,073,844

LIGHTED BAGGAGE PIECE

Sherri A. Coyner, and Donna L. Landers, both of Indianapolis, Ind., assignors to The AnnLouise Partnership, Indianapolis, Ind.

Filed Jan. 11, 1991, Ser. No. 639,984
Int. Cl.[5] A45C *15/6*
U.S. Cl. 362—156 9 Claims



1. A lighted baggage member comprising

(1) a shell having an exterior surface and an interior surface, the interior surface including a first side wall, a bottom wall, and a second side wall,

(2) a power source means,

(3) a switch means operatively coupled to the power source means, and

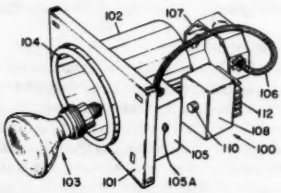
(4) a string of lights encased in a generally transparent flexible tubular plastic shield, and disposed along the interior surface of the shell, to extend along a portion of each of the first side wall, bottom wall, and second side wall, the lights being operatively coupled to the power source means and the switch means.

5,073,845

FLUORESCENT RETROFIT LIGHT FIXTURE

Truman R. Aubrey, Glendale, Calif., assignor to Janice Industries, Inc., Azusa, Calif.

Filed Apr. 10, 1989, Ser. No. 335,553
Int. Cl.[5] H01R *33/00*
U.S. Cl. 362—226 18 Claims



1. A retrofit lighting fixture comprising,

a housing including a receptacle for receiving a light source,

a splice box joined to said housing,

connection means for making an electrical connection from an external power source to said receptacle in said housing via said splice box, and

ballast means selectively connected to said splice box in situ,

said ballast means is mechanically connected to and supported by said splice box,

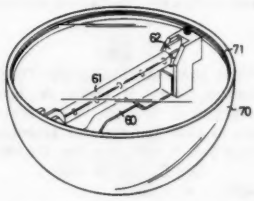
said ballast means is electrically interconnected in series with said connection means.

5,073,846

SAFETY DEVICE FOR HALOGEN LIGHT

Ming I. Lin, No. 7, Lane 97, Ho Ping Rd., Lu Chou Hsiang, Taipei Hsien, Taiwan

Filed Oct. 26, 1990, Ser. No. 603,412
Int. Cl.[5] F21K *5/20*
U.S. Cl. 362—263 1 Claim



1. A safety device for halogen lights comprising:

a body having a vertical side surface with a lower half portion thereof cut off, an opposite vertical side surface with a groove formed in an upper portion thereof, and a partially cut off top surface, said vertical side surface and said top surface each being provided with a pin hole, said opposite vertical side surface being provided with a cotter hole on a lower portion thereof;

a rod having a hemi-spherical lower portion and an upper outer ring provided through said pin hole of said top surface, said lower portion of said rod bearing against an inner wall of said body;

a spring being provided to envelop most of an upper portion of said rod and having an upper end inserted into said upper outer ring and a lower end bearing against said top surface of said body;

an upper conducting plate having a vertical plate and a right angle bend extending from an upper end of said vertical plate, said vertical plate having a hole to align with said pin hole on said vertical side surface of said body for a pin to pass therethrough and interlock said upper conducting plate into said body thereby; said upper conducting plate further having a groove provided on said right angle bend;

a lower conducting plate having an upper right angle bend, a middle vertical plate, and a lower curved bend, said lower conducting plate being provided slightly below said groove of said upper conducting plate so as to form a loop when said groove is pushed by said rod, said middle vertical plate having a hole to encompass a holder for holding a light, said lower curved bend having a curve between said lower curve bend and said middle plate and a middle piece extending upwardly to contact against said body and fix therein;

a hat-like holder having a hole to align with said cotter hole for a cotter pin to pass therethrough and fix thereby; and

a light mask being provided for said body with a plate to push down said spring together with said road and said upper conducting plate to form a loop therein.

5,073,847

VARIABLE COLOR LIGHTING INSTRUMENT

James M. Bornhorst, DeSoto, Tex., assignor to Vari-Lite, Inc., Dallas, Tex.

Filed Sep. 6, 1990, Ser. No. 578,594
Int. Cl.[5] F21V *9/12*
U.S. Cl. 362—293 20 Claims

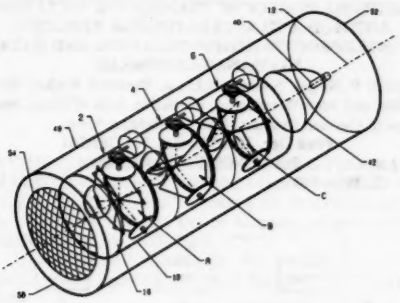
1. A lighting instrument comprising:

a light source for projecting a beam of light along a primary axis of the instrument;

at least a first set of filters rotatably supported within the instrument, each filter being characterized in that light passing through the filter varies in color depending upon

the angular orientation of the filter with respect to the light beam; and

a drive mechanism for each set of filters carried by the instrument and connected to the respective filters for rotating each filter about an axis, the axis of rotation of each filter intersecting the primary axis and the axis of



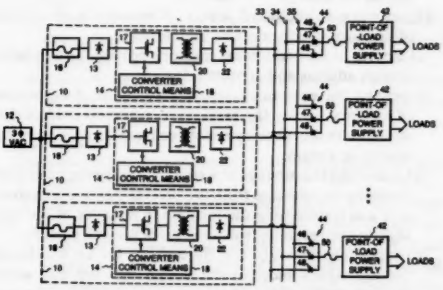
rotation of at least one other filter at a common point, each filter being rotatable through a range of positions from an open position in which the filter is disposed substantially parallel to the primary axis to a closed position, whereby the set of filters in the closed position intercepts substantially the entire light beam passing through the instrument.

5,073,848

POWER DISTRIBUTION SYSTEM

Robert L. Steigerwald, Burnt Hills, N.Y.; Peter M. Koninsky, Mount Laurel, and Gerhard A. Franz, Princeton, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 21, 1990, Ser. No. 616,965
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—65 **4 Claims**



1. A power distribution system for distributing power to a plurality of point-of-load power supplies, comprising:

a source of electrical power;

a plurality of power converters for receiving an input voltage from said source of electrical power and converting said voltage to a dc voltage;

a separate respective dc power distribution bus coupled to the output of each respective power converter; and

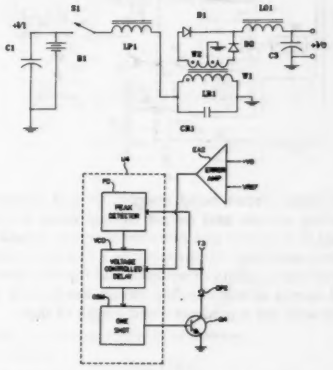
OR gate means for coupling each respective dc power distribution bus to each respective point-of-load power supply.

5,073,849

RESONANT DC TO DC CONVERTER SWITCHING AT ZERO CURRENT

George Q. Morris, Thousand Oaks, Calif., assignor to Power-One, Inc., Camarillo, Calif.

Continuation-in-part of Ser. No. 286,991, Dec. 20, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,720
Int. Cl.[5] H02M *3/335, 3/337*
U.S. Cl. 363—21 **25 Claims**



1. A resonant power converter, comprising:

at least one primary inductor connected for receiving an input supply voltage from a power source;

at least one unidirectional switch connected to alternately enable and disable the flow of current through said primary inductor;

a resonant tank circuit connected in series with said primary inductor, said tank circuit including:

a resonant inductor having a primary inductive winding and a secondary inductive winding; and

a resonant capacitor connected in parallel with said primary inductive winding;

the switch enabling current flow through said primary inductor only in a direction from the power source to the tank circuit;

a switch control connected to open and close said switch, said switch control closing said switch to achieve phase modulation after the voltage of the resonant tank circuit has passed a peak value at a polarity which urges current to flow from the power source to the tank circuit; and

an output terminal connected in circuit with said secondary inductive winding.

5,073,850

START CIRCUIT FOR A POWER SUPPLY CONTROL INTEGRATED CIRCUIT

Wilson D. Pace, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 3, 1991, Ser. No. 709,471
Int. Cl.[5] G05F *1/56*; H02M *7/23*
U.S. Cl. 363—89 **8 Claims**

1. A power supply control integrated circuit, comprising:

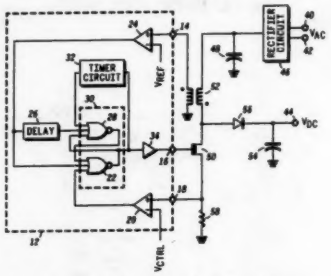
a first comparator having first and second inputs and an output, said first input being coupled to receive a first voltage signal, said second input being coupled to receive a first reference voltage;

a second comparator having first and second inputs and an output, said first input of said second comparator being coupled to receive a second voltage signal, said second input of said second comparator being coupled to receive a second reference voltage;

a flip-flop circuit having a plurality of inputs and an output,

a portion of said plurality of inputs of said flip-flop circuit being responsive to said outputs of said first and second comparators, said output of said flip-flop circuit providing an output signal of the power supply control integrated circuit; and

a timer circuit having an input and an output, said input of



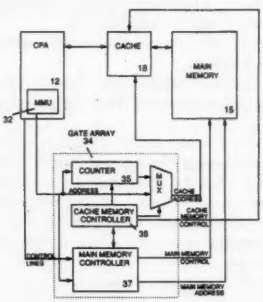
said timer circuit being coupled to said output of said flip-flop circuit, said output of said timer circuit being coupled to one of said plurality of inputs of said flip-flop circuit, said timer circuit applying a first logic state to said one of said plurality of inputs of said flip-flop circuit when said output of said flip-flop circuit has been in a second logic state for a predetermined length of time.

5,073,851

APPARATUS AND METHOD FOR IMPROVED CACHING IN A COMPUTER SYSTEM

Anthony Masterson, and Mark Krueger, both of Cupertino, Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Filed Feb. 21, 1990, Ser. No. 482,790
Int. Cl.[5] G06F *13/00*
U.S. Cl. 395—425 **4 Claims**



1. In a computer system having a central processing unit coupled to a main memory and a cache memory wherein blocks of said main memory are organized as pages having a predetermined number of bytes, a cache management system comprising:

a) memory management unit means integrated with said central processing unit for assigning virtual addresses to data stored in said cache memory and for transferring page sized blocks of data from said main memory to said cache memory by a read operation on said main memory and a write operation on said cache memory, said virtual addresses being used by said memory management unit means to determine whether data being addressed by said central processing unit is located in said cache memory or said main memory;

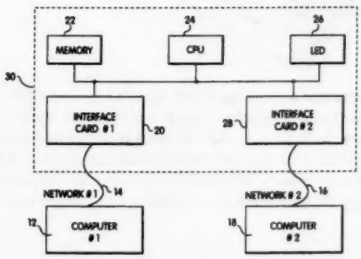
b) means coupled to said memory management means, said cache memory and said main memory for determining whether data at an address which is required to be accessed by said central processing unit is not in said cache memory, and for such data, commencing said read operation and prior to completion of said read operation, commencing said write operation such that said data being read from said main memory is substantially simultaneously written to said cache memory.

5,073,852

NETWORK PROTOCOL TRANSLATOR INCLUDING METHOD AND APPARATUS FOR REDUCING INTERPROCESS COMMUNICATION AND DATA EXCHANGE OVERHEAD

Kenneth P. Siegel, Nashua, N.H.; J. Bradford Parker, Somerville, and John Wroclawski, Brookline, both of Mass., assignors to Cayman Systems, Inc., Cambridge, Mass.

Filed Dec. 16, 1988, Ser. No. 285,761
Int. Cl.[5] G06F *15/16, 13/00*
U.S. Cl. 395—700 **2 Claims**



1. A method for interprocess communication and data exchange within a computer software operating system executing on a computer network protocol translator having a central processing unit and associated memory for storing information, said memory connected to and controlled by at least said central processing unit, which method provides for the exchange of data between software processes executing on said network protocol translator, comprising the steps of:

(a) assigning a unique address in the memory address space for each software process that is to receive a message;

(b) designating said address as the entry point for accessing each software process which is to receive messages;

(c) allocating a portion of the memory in the computer system for storage of a message;

(d) assigning an additional portion of memory to the portion of memory which contains the message;

(e) storing in said additional memory portion a completion routine address and context information;

(f) posting the message by queueing a location of the portion of memory storing the message to a process control data structure in the memory maintained and controlled by the operating system;

(g) delivering the message to a receiving software process by dequeing the message from the process control data structure and transmitting the location in memory of the message to the receiving software process's entry point;

(h) repeating steps (d), (e), (f), and (g) for each software process which receives the posted message and which requires notification of subsequent processing of the message;

(i) sequentially, in the reverse order in which the additional memory portions have been appended to the original memory portion, calling the completion routine's address stored in the last appended memory area by the operating system when a message is finished being processed;

(j) executing said completion routine in conjunction with context information stored in the same additional memory portion;

(k) using a result of the execution of the completion routine to determine whether to call the address of the completion

routine stored in the next to the last additional memory portion by the operating system software; and

(l) repeating steps (a) through (c) sequentially, until all completion routines in all additional memory portions having been executed, so that the status of the processing of the message is reported back to the originating software process without requiring the receiving software process to generate and transmit a message.

5,073,853

WATCHDOG CIRCUIT FOR MONITORING PROGRAMS AND DETECTING INFINITE LOOPS USING A CHANGING MULTIBIT WORD FOR TIMER RESET

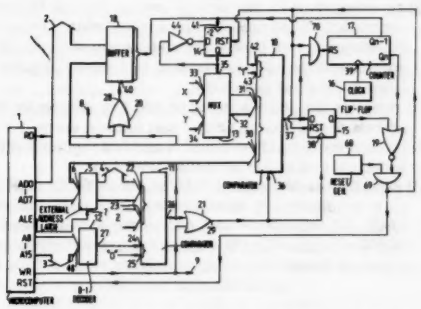
Nigel L. Johnson, Wisbech, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 2, 1987, Ser. No. 116,415

Claims priority, application United Kingdom, Nov. 3, 1986, 8626197

Int. Cl.[5] G06F *11/30*

U.S. Cl. 395—575 **13 Claims**



1. A programmed digital data processing system including:

(a) a watch-dog circuit comprising:

(i) a reset signal input means for receiving successive reset signals;

(ii) timer means, coupled to be reset in response to the successive reset signals having a relevant predetermined value; and

(iii) means for supplying an output signal when a time interval between successive resets of the timer means exceeds a predetermined length;

(b) programmed means for

(i) assuming a predetermined state in response to said output signal;

(ii) supplying the successive reset signals to said reset signal input means at time intervals which do not exceed said predetermined length, said successive reset signals each being in the form of a multibit word having the relevant predetermined value, which relevant predetermined value changes for the successive reset signals in a predetermined manner;

(iii) assigning, during each interval between successive reset signals, a next predetermined value to the multibit word for transmission as a next reset signal; and

(iv) performing program steps, of a program being watched by the watch-dog circuit, between:

(A) each assigning operation and an immediately preceding supply of a reset signal; and

(B) each assigning operation and an immediately succeeding supply of a reset signal.

5,073,854

DATA PROCESSING SYSTEM WITH SEARCH PROCESSOR WHICH INITIATES SEARCHING IN RESPONSE TO PREDETERMINED DISK READ AND WRITE COMMANDS

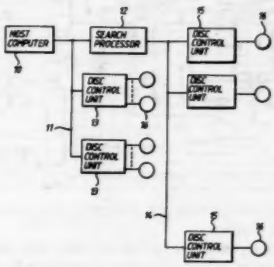
Michael W. Martin, Camberley; John C. Moor, Wokingham, and Terence J. Bird, Simmondley, all of Great Britain, assignors to International Computers Limited, London, England

Filed May 16, 1989, Ser. No. 352,370

Claims priority, application United Kingdom, Jul. 9, 1988, 8816413

Int. Cl.[5] G06F *7/06*

U.S. Cl. 364—425 **9 Claims**



1. A data processing system comprising:

(a) a data bus,

(b) host computer means connected to the bus, for issuing disk read and disk write commands in a predetermined format on the bus,

(c) a plurality of disk file units connected to the bus, for responding to each of said disk read commands; each of said disk write commands by sending and receiving blocks of data over the bus, to and from said host computer means and

(d) search processor means connected to said bus, for responding to a predetermined one of said disk write commands by setting up a search criterion specified by that command, and for responding to a predetermined one of said disk read commands by performing a search operation to retrieve data items satisfying said search criterion and returning those data items over said bus to the host computer means.

5,073,855

RESOURCE CONFLICT DETECTION METHOD AND APPARATUS INCLUDED IN A PIPELINED PROCESSING UNIT

Deborah K. Staplin, Chelmsford; Jian-Kuo Shen, Belmont, and Ming-Tzer Miu, Chelmsford, all of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Jun. 30, 1989, Ser. No. 374,882

Int. Cl.[5] G06F *9/38*

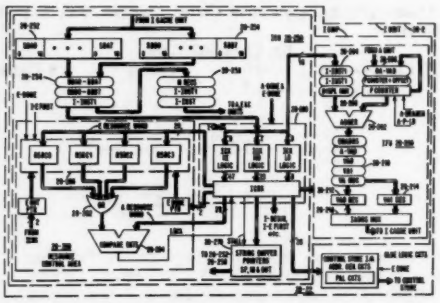
U.S. Cl. 395—375 **20 Claims**

1. A method for detecting the presence of resource conflicts and for enabling a resolution of such resource conflicts in a pipelined processing unit comprising a number of serially coupled pipeline stages, each stage for performing a different operation on each instruction to be executed by said processing unit, said method comprising the steps of:

(a) storing in a number of resource registers of the first stage of said pipelined processing unit, bit indications designating those resources being utilized by the instructions currently under execution by said pipeline stages;

(b) generating a number of sets of bit indications representative of a number of resource words for each new instruction to be processed which are coded to specify those resources required for executing said new instruction by each pipeline stage;

(c) comparing predetermined ones of said number of sets of bit indications with said stored bit indications;
(d) generating a signal in response to an equal comparison between any two corresponding bit indications indicating a resource conflict for inhibiting the transfer of said new instruction into one of said pipeline stages;
(e) repeating step (c) and generating a signal when there is



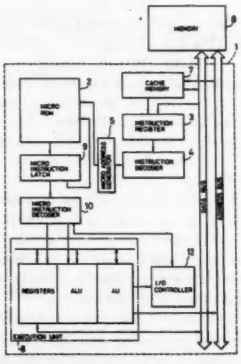
no equal comparison for indicating the removal of said resource conflict;
(f) transferring said new instruction into said pipeline stages for execution in response to said signal indicating said no equal comparison in step (e); and
(g) loading signal indications of another predetermined one of said number of sets of bit indications into a next available one of said number of said resource registers.

5,073,856

METHOD OF SEARCHING A QUEUE IN RESPONSE TO A SEARCH INSTRUCTION

Ken Sakamura, Tokyo; Kouzi Hashimoto, Mitaka; Ikuya Kawasaki, Kodaira; Atsushi Hasegawa, Koganei, and Kazuhiko Iwasaki, Hachiohji, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer System, Inc., both of Tokyo, Japan

Continuation of Ser. No. 89,818, Aug. 27, 1987, Pat. No. 4,926,321. This application Mar. 26, 1990, Ser. No. 489,240
Claims priority, application Japan, Aug. 27, 1986, 61-198869
Int. Cl.[5] G06F *9/30, 15/40*
U.S. Cl. 395—375 **9 Claims**



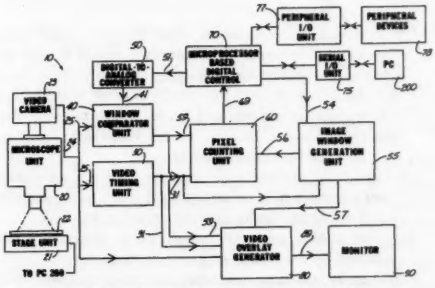
1. A method of searching a memory of a data processing apparatus, said memory having an array data structure formed by a plurality of entries which are searched in response to execution of a search instruction having a predetermined field for holding search direction information, each of said entries has a first field for storing address data indicating a first field of another entry, a second field for storing address data indicating first field of another entry and a third field having a designated offset from said first field and having stored therein a predetermined key, said method comprising the steps of:
(a) storing an address of said first field of a selected entry in a first register;
(b) copying the address stored in said first register into a second register;
(c) adding said designated offset to the address stored in said first register to produce an offset address and reading out said predetermined key stored in said third field of said selected entry;
(d) comparing said predetermined key read out of said selected entry to a predetermined condition value to determine if a relationship therebetween satisfies a predetermined relationship;
(e) indicating completion of said search operation if the comparing in step (d) indicates that said predetermined relationship is satisfied;
(f) selecting one of a step (g) and a step (j) on the basis of said search direction information if the comparing in step (d) indicates that said predetermined relationship is not satisfied;
(g) replacing the address stored in said first register by the address of said first field of said selected entry;
(h) comparing the address stored in said first register and the address stored in said second register;
(i) repeating steps (c) through (e) and (g) through (h) until occurrence of said predetermined relationship is found to be satisfied in step (e) and the address stored in said first register and the address stored in said second register is found to be equal in step (h);
(j) replacing the address stored in said first register by the address of said second field of said selected entry;
(k) comparing the address stored in said first register and the address stored in said second register; and
(l) repeating steps (c) through (e) and steps (j) through (k) until occurrence of said predetermined relationship is found to be satisfied in step (e) and the address stored in said first register and the address stored in said second register is found to be equal in step (k).

5,073,857

METHOD AND APPARATUS FOR CELL ANALYSIS

Richard K. Peters; Donald V. Elmerick, both of Tallmadge; James L. Spayer, Brecksville, and Gerald E. Walter, Cleveland, all of Ohio, assignors to Accuron Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 360,221, Jun. 1, 1989. This application Aug. 28, 1989, Ser. No. 399,824
Int. Cl.[5] G06F *7/38;* **G06K** *1/00*
U.S. Cl. 364—413.1 **19 Claims**



1. A method of cell analysis for a smear inspection apparatus having: a cytological smear, a specimen slide, a microscope including a video camera mounting, a mechanized microscope

stage, a video input provided by a video camera mounted on said video camera mounting, a video timing unit, a non-magnifying image window generator, a digital-to-analog converter, a comparator, a pixel counter, a microprocessor control, a computer program for the microprocessor, and an external computing device having an associated computer program, said method comprising:

choosing an appropriate sub-area of an image represented by said video input through the use of said non-magnifying image window generator, wherein, the image window generator serves no magnification function, but merely limits the analysis to that area within the chosen window;

transforming said input video signal into a binary form by comparing the gray level of said input signal to a threshold level in analog form, wherein the threshold level is produced in analog form from a digital gray level through the use of said digital-to-analog converter;

summing the ON pixels along one horizontal line within said image sub-area of the binary signal and then outputing said sum to said microprocessor control;

summing the total number of ON pixels within entire said image sub-area by adding the output after each line to the ongoing total;

comparing total number of ON pixels with a predetermined limit, wherein, the current sub-area will fail the inspection if the total exceeds said limit; and,

moving said mechanized microscope stage mechanically and systematically so that the analysis is done in increments to cover the entire area of said specimen wherein, the movement of the specimen slide occurs in a programmed and sequential fashion under control of said external computer device and its associated computer program, and wherein, the increment size by which the stage is displaced corresponds generally to the size of the image window.

5,073,858

MAGNETIC SUSCEPTIBILITY IMAGING (MSI)

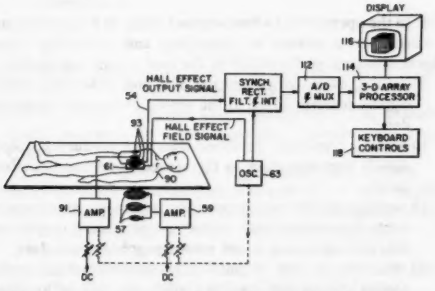
Randell L. Mills, R.D. 2, Cochranville, Pa. 19330

Continuation-in-part of Ser. No. 679,884, Dec. 10, 1984, abandoned. This application Nov. 10, 1988, Ser. No. 269,630

The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.

Int. Cl.[5] G06F *15/42;* **A61B** *5/05;* **G01N** *27/76*

U.S. Cl. 364—413.13 **16 Claims**



1. Apparatus for providing a multidimensional image representation of the spatial variations of magnetic susceptibility in a volume, comprising:

a generator for providing an excitation field in the region of said volume which affects a paramagnetic substance or a diamagnetic substance in said volume;

a detector for detecting a magnetic field originating in said volume from said paramagnetic or diamagnetic substances in response to said excitation field and according to the susceptibility of said volume, and having an output signal;

a nullifier for nulling said excitation field in the region of said detector; and

a reconstruction processor for reconstructing said multidimensional image representation according to the output signal of said detector.

5,073,859

RATIO CONTROL FOR CONTINUOUSLY VARIABLE TRANSMISSION

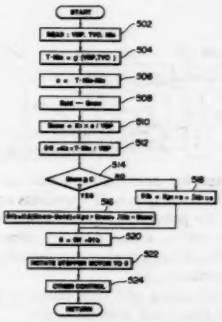
Yutaka Suzuki, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 4, 1990, Ser. No. 592,933

Claims priority, application Japan, Oct. 4, 1989, 1-259376

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—424.1 **10 Claims**



1. A ratio control system for a continuously variable transmission in a motor vehicle including an engine, the continuously variable transmission being drivingly connected to the engine and being shiftable in reduction ratio, the continuously variable transmission including an input member, the control system comprising:

means for detecting a revolution speed of the input member and for generating an actual revolution speed indicative signal indicative of said detected revolution speed;

means for detecting a vehicle speed of said vehicle and for generating a vehicle speed indicative signal indicative of said vehicle detected speed;

a control unit receiving said input revolution speed indicative signal and said vehicle speed indicative signal and generating an output signal; and

means for physically shifting the continuously variable transmission by changing a reduction ratio in the continuously variable transmission in response to said output signal,

said control unit including

means for determining a target reduction ratio of said transmission and for generating a target reduction ratio indicative signal;

means for determining an actual reduction ratio of said transmission and for generating an actual reduction ratio indicative signal indicative of said actual reduction ratio;

means for determining a ratio deviation between said actual reduction ratio indicative signal and said target reduction ratio indicative signal;

means for determining a target input revolution of said input member and for generating a target input revolution speed indicative signal indicative of said determined target input revolution;

means for determining an input revolution speed deviation between said actual input revolution speed indicative signal and said target input revolution speed indicative signal;

means for comparing said ratio deviation with a predetermined value; and

means for effecting a first feedback control on said ratio deviation when said ratio deviation is greater than or equal to said predetermined value, and for effecting a

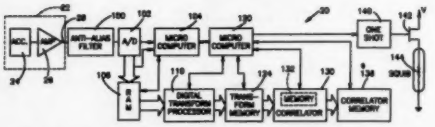
second feedback control on said input revolution speed deviation when said ratio deviation is less than said predetermined value.

5,073,860

METHOD AND APPARATUS FOR SENSING A VEHICLE CRASH IN REAL TIME USING FREQUENCY DOMAIN ANALYSIS

Brian K. Blackburn, Rochester Hills; Scott B. Gentry, and Joseph F. Mazur, both of Utica, all of Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Nov. 7, 1989, Ser. No. 433,344
Int. Cl.[5] B60R *21/32, 21/00*
U.S. Cl. 364—424.05 **25 Claims**



1. An apparatus for controlling actuation of a passenger restraint system in a vehicle, said apparatus comprising:

sensing means for providing, upon the occurrence of a vehicle crash condition, a time domain vibratory electric signal having frequency components indicative of such vehicle crash condition;

means for transforming said time domain vibratory electric signal into a frequency domain signal;

means for correlating said frequency domain signal and for providing a signal indicative of the degree of correlation; and

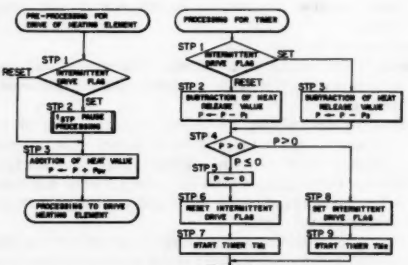
means for actuating the passenger restraint system when said correlation signal indicates a particular type of vehicle crash is occurring.

5,073,861

METHOD OF AND APPARATUS FOR PREVENTING OVERHEATING OF HEATING ELEMENT

Toshikazu Itoh, and Toshiroh Suemune, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 5, 1987, Ser. No. 58,888
Claims priority, application Japan, Jun. 27, 1986, 61-149402
Int. Cl.[5] G06F *3/12*
U.S. Cl. 364—550 **6 Claims**



1. A method of driving a heating element and preventing overheating of the heating element, the method comprising the steps of:

(a) setting the total of a heat release value to "0" after powering a first timer so as to start said first timer, said first timer serving to count a prescribed first time interval; then,

(b) subtracting a first allowable heat release value of the heating element from a total value of the heat released by the heating element at the end of said first time interval to obtain a first remainder, and returning to step (a) when said first remainder is a non-positive value, while proceeding to step (c) when said first remainder is any value other than non-positive values;

(c) starting a second timer, said second timer serving to count a prescribed second time interval; then,

(d) subtracting a second allowable heat release value of the heating element from a total value of the heat released by the heating element at the end of said second time interval to obtain a second remainder, and returning to step (a) when said second remainder of said subtraction is a non-positive value, while returning to step (c) when said second remainder is any value other than non-positive values;

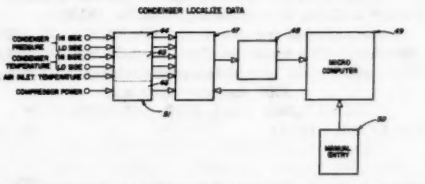
wherein a prescribed pause time is provided before driving the heating element only during the time interval counted by said second timer, whereby the pause time allows heat dissipation in the heating element so as to thereby prevent the overheating thereof.

5,073,862

METHOD AND APPARATUS FOR DIAGNOSING PROBLEMS WITH THE THERMODYNAMIC PERFORMANCE OF A HEAT ENGINE

Peter J. Carlson, 8604 Battom Ct., Raleigh, N.C. 27612

Continuation of Ser. No. 89,514, Aug. 26, 1987, abandoned. This application Oct. 31, 1989, Ser. No. 430,072
Int. Cl.[5] G06F *15/20;* **G01M** *15/00*
U.S. Cl. 364—551.01 **14 Claims**



1. In the operation of a heat engine having an evaporator and a condenser, a method of diagnosing and evaluating actual thermodynamic performance of the heat engine comprising:

a) sensing evaporator localized data and producing output signals corresponding to the sensed evaporator localized data;

b) sensing condenser localized data and producing output signals corresponding to the sensed condenser localized data;

c) sensing indoor psychrometric data in an environment controlled by the heat engine and producing output signals corresponding to the sensed psychrometric data;

d) transmitting the output signals corresponding to the sensed evaporator localized data, condenser localized data, and psychrometric data to a processing means and calculating a performance data set indicative of the actual thermodynamic performance of the heat engine;

e) storing a predefined performance data set in a memory device operatively connected to the processing means, the predefined performance data set being representative of a normal thermodynamic performance of the heat engine;

f) comparing the calculated performance data set with the predefined performance data set stored in memory to yield a comparative result indicative of whether the heat engine is operating normally; and

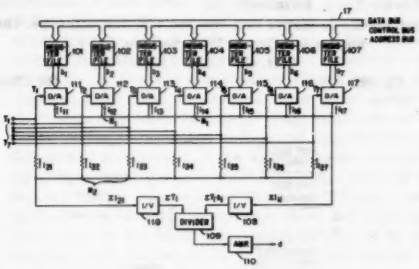
g) displaying the comparative result.

5,073,863

TRUTH VALUE CONVERTER

Hongmin Zhang, Machida, Japan, assignor to APT Instruments Corp., Tokyo, Japan

Filed Dec. 4, 1989, Ser. No. 445,549
Claims priority, application Japan, Dec. 7, 1988, 63-307700
Int. Cl.[5] G06F *7/38*
U.S. Cl. 364—715.01 6 Claims



1. A truth value converter, comprising:

a processor for supplying a plurality of weighted coefficients each of which represents a function of a consequent of an implication by a singleton;

a memory connected to the processor to store each weighted coefficient as digital data;

an input means for receiving a plurality of input truth values as first analog signals respectively corresponding in number to the number of weighted coefficients;

a plurality of digital to analog (D/A) converters, each of which converts a respective weighted coefficient into a corresponding second analog signal in accordance with a respective first analog signal, each second analog signal being proportional to both the respective weighted coefficient and the respective first analog signal;

a first analog adder that sums the second analog signals to form a third analog signal;

a second analog adder that sums the first analog signals to form a fourth analog signal;

an analog divider that divides the third analog signal by the fourth analog signal to form a fifth analog signal; and

an output means that delivers the fifth analog signal as a control signal.

5,073,864

PARALLEL STRING PROCESSOR AND METHOD FOR A MINICOMPUTER

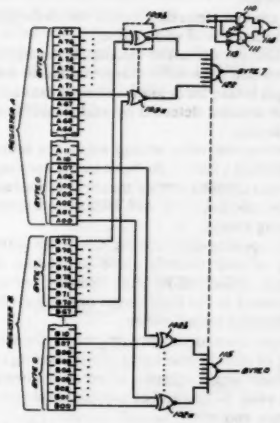
David H. Methvin, Boulder, Colo., and Chong S. Un, Anaheim, Calif., assignors to Davin Computer Corporation, Irvine, Calif.

Continuation-in-part of Ser. No. 267,460, Nov. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 262,225, Oct. 21, 1988, Pat. No. 4,896,133, which is a continuation of Ser. No. 88,421, Aug. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 12,834, Feb. 10, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 478,844
Int. Cl.[5] G06F *7/00, 15/00, 7/02;* G05B *1/00*
U.S. Cl. 364—715.11 34 Claims

1. A parallel byte string processor that finds the location of matching bytes in first and second data words, each data word having a predetermined number of data bytes, said parallel byte processor comprising:

a first circuit that performs an exclusive-OR operation on said first and second data words on a byte-by-byte basis, and provides an output bit corresponding to each byte of said first data word, each said output bit having first and second logic levels such that an output bit has said first logic level when the corresponding byte in said first data word matches the corresponding byte in said second data word and has said second logic level when the corresponding byte in said first data word does not match the corresponding byte in said second data word; and

a second circuit that receives said output bits from said first circuit, said second circuit providing a digital output value that identifies the location of an output bit from said first



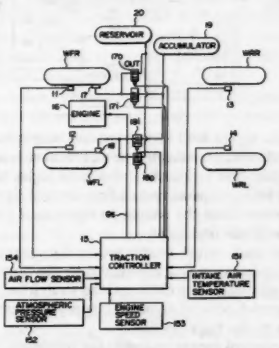
circuit that has a predetermined positional characteristic with respect to the other output bits from said first circuit, said identified bit indicating the location of a byte in said first data word that has a selected matching or non-matching characteristic with respect to the byte in the corresponding location of said second data word.

5,073,865

VEHICLE ENGINE OUTPUT CONTROL APPARATUS

Kazuhide Togai, Takatsuki; Yoshiaki Danno, Kyoto; Masato Yoshida, Kyoto; Makoto Shimada, Kyoto, and Katsunori Ueda, Kyoto, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1990, Ser. No. 468,272
Claims priority, application Japan, Jan. 20, 1989, 1-11616
Int. Cl.[5] F02D *11/10*
U.S. Cl. 364—431.05 10 Claims



1. An engine output control apparatus for a vehicle, comprising:

operation condition detecting means for detecting an operation condition of the vehicle;

target output setting means for setting a target output of an engine of the vehicle in accordance with the detection result of said operation condition detecting means;

target intake air amount setting means for setting a target intake air amount of said engine in accordance with the target output set by said target output setting means;

a throttle valve arranged in an intake path of said engine;

basic target opening setting means for setting a basic target opening of said throttle valve on the basis of the target intake air amount set by said target intake air amount setting means;

intake air amount detecting means for detecting an actual intake air amount of said engine;

intake air amount deviation calculating means for calculating a deviation between the target intake air amount set by said target intake air amount setting means and the actual intake air amount detected by said intake air amount detecting means;

opening correction value setting means for setting an opening correction value of the basic target opening set by said basic target opening setting means in accordance with the deviation calculated by said intake air amount deviation calculating means;

first target opening determining means for setting a target opening of said throttle valve by adding the opening correction value set by said opening correction value setting means to the basic target opening set by said basic target opening setting means;

second target opening determining means for setting a target opening of said throttle valve corresponding to the uncorrected basis target opening when an abnormal intake air amount value is detected by said intake air amount detecting means; and

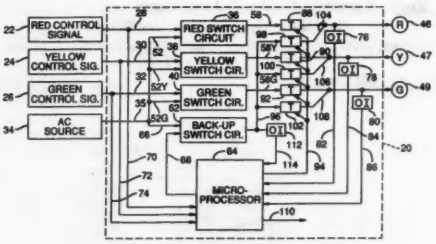
throttle valve controlling means for open/close-controlling said throttle valve in accordance with the target opening set by said first or second target opening determining means.

5,073,866

TRAFFIC SIGNAL CONTROL SYSTEM

Michael J. Daeges, 16771 W. Ellendale Rd., Dallas, Oreg. 97338

Filed Sep. 20, 1989, Ser. No. 409,806
Int. Cl.[5] B60Q *9/00*; G06F *15/48*
U.S. Cl. 364—436 **10 Claims**



1. A traffic signal load switch system, comprising:

a first load switch connected to a current source and having an output line connected to a first light, the first load switch being responsive to a first control signal for applying current from the source to the output line thereby to illuminate the first light;

a back-up load switch connected to the current source and having a back-up line connected to the output line of the first load switch, the back-up load switch being responsive to a second control signal for applying current from the source to the back-up line;

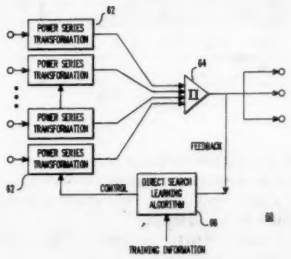
back-up control means operable for interrupting the flow of current applied on the output line by the first load switch and for applying the second control signal to the back-up load switch so that the back-up load switch applies source current to the first light over the connected back-up line and output line, the back-up control means including a first control switch connected to the output line between the first load switch and the first light, the first control switch being operable for interrupting the flow of current applied on the output line by the first load switch.

5,073,867

DIGITAL NEURAL NETWORK PROCESSING ELEMENTS

John H. Murphy, and Terry A. Jeeves, both of Penn Hills Township, Allegheny County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 364,475, Jun. 12, 1989. This application Oct. 3, 1989, Ser. No. 416,626
Int. Cl.[5] G06F *15/18*
U.S. Cl. 395—27 **14 Claims**



1. A neural network element, comprising:

a digital input circuit for performing a digital linear or power series transformation on digital input values; and

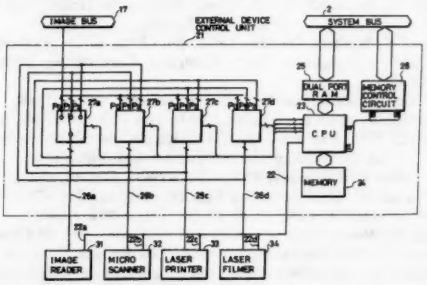
a digital combining circuit for digitally combining the transformed input values and producing a neural node signal.

5,073,868

MULTIPLE UNIT IMAGE PROCESSING WITH A DIRECT MODE AND MULTI-MODE COPYING CAPACITY

Kaoru Tada, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 290,995, Dec. 28, 1988, abandoned. This application Apr. 25, 1991, Ser. No. 693,762
Claims priority, application Japan, Dec. 28, 1987, 62-333759
Int. Cl.[5] G06F *15/62*
U.S. Cl. 395—112 **4 Claims**



1. An image processing system comprising:

an image processing section including a data processing unit for processing image data and an image memory for storing image data;

an external image input device for inputting image data;

an external image output device for outputting copies of image data;

a connection unit for connecting the external image input device and the external image output device to the image

processing section, said connection unit being capable of providing direct connection between the external image input device and the external image output device;

mode setting means for defining a direct mode which enables the direct connection between the external image input device and the external image output device not through the image processing section;

entering means for entering a number of copies of image data;

connection control means for controlling the connection unit to connect the external image input device and the external image output device in either a first manner wherein the external image input device is directly connected to the external image output device so that the image data input by the external image input device is directly transferred to the external image output device to output copies of the image or a second manner wherein the external image input device is connected to the external image output device through the image memory so that the image data input by the external image input device is once stored in the image memory and the image data stored in the image memory is transferred to the external image output device to provide the number of copies of the image data entered by the entering means; and

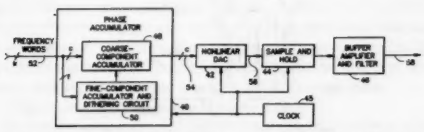
determining means, when the direct mode is defined by the mode setting means and a plural number of copies are entered by the entering means, for determining which manner of the first and second manners can provide copies of the image data in a shorter period of time and for causing the connection control means to control connection of the external image input device and the external image output device in the manner determined to provide copies in the shorter period of time.

5,073,869

SUPPRESSION OF SPURIOUS FREQUENCY COMPONENTS IN DIRECT DIGITAL FREQUENCY SYNTHESIZER

Bjorn E. Bjerede, La Jolla, Calif., assignor to Titan Linkabit Corporation, San Diego, Calif.

Filed Aug. 25, 1989, Ser. No. 398,735
Int. Cl.[5] G06F 1/02
U.S. Cl. 364—718 **3 Claims**



1. A frequency synthesizer for generating an analog waveform of a predetermined frequency from accumulated digital frequency words which, as accumulated, represent the phase of a cyclic waveform of said predetermined frequency, comprising

a c-bit coarse-component accumulator for accumulating coarse phase components of the digital frequency words wherein c is an integer;

means for accumulating fine phase components of the digital frequency words;

means for incrementing the coarse-component accumulator in response to the accumulated fine phase components exceeding a predetermined value;

a c-bit non-linear digital-to-analog converter for converting the c bits accumulated in the coarse-component accumulator into an analog waveform of said predetermined frequency; and

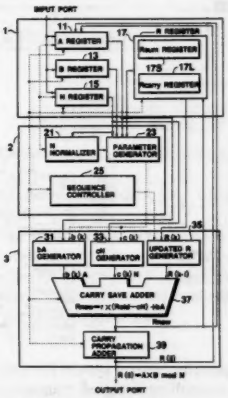
means for suppressing the generation of spurious frequency components in the analog waveform by randomly dithering the rate at which the coarse component accumulator is incremented by said incrementing means.

5,073,870

MODULAR MULTIPLICATION METHOD AND THE SYSTEM FOR PROCESSING DATA

Hikaru Morita, Hichiohji, Japan, assignor to Nippon Telegraph and Telephone Corporation, Japan

Filed Jan. 29, 1990, Ser. No. 471,787
Claims priority, application Japan, Jan. 30, 1989, 1-17700; Jun. 9, 1989, 1-147795; Aug. 11, 1989, 1-206973
Int. Cl.[5] B06F 7/38
U.S. Cl. 364—746 **7 Claims**



1. A modular multiplication system for executing a modular multiplication of A×B modulo N on the basis of a radix number r, where A denotes a multiplicand, B denotes a multiplier, and N denotes a modulus, which comprises:

(a) first register means (**11**) for storing a multiplicand A;

(b) second register means (**13**) for storing a multiplier B;

(c) third register means (**15**) for storing a modulus N;

(d) fourth register means (**17**) for storing a partial remainder R;

(e) normalizing means (**21**) responsive to said third register means for normalizing the modulus N;

(f) parameter generating means (**23**) responsive to said first, second, third and fourth register means and said normalizing means, for generating partial multipliers b(k) and partial quotient c(k), where (k) denotes a number of processing stages from (k=n/r'+1) to (0);

(g) partial product generating means (**31**) responsive to said first register means and said parameter generating means, for generating partial products b(k)A;

(h) modular subtracter generating means (**33**) responsive to said third register means and said parameter generating means, for generating modular subtracters c(k)N;

(i) remainder updating means (**35**) responsive to said fourth register means, for updating remainder R(k);

(j) carry save adder means (**37**) responsive to said partial product generating means, said modular subtracter generating means, and said remainder updating means, for executing carry save addition of $R_{new} \leftarrow r \times (R_{old} - c(k)N) + b(k)A$ to update the remainder R(k) stored in said fourth register means, where R_{new} denotes an updated remainder;

(k) carry propagation adder means (**39**) responsive to said carry save adder means, for executing carry propagation addition to update the multiplicand A stored in said first register means by R_{new} and generating a solution of $R(0) = A \times B$ modulo N; and

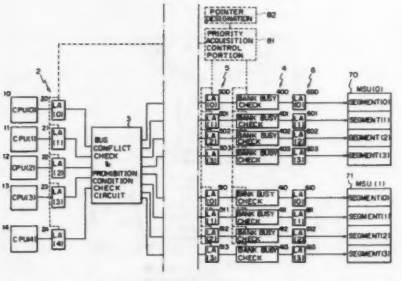
(l) sequence control means responsive to all said means, for sequentially controlling computational operations.

5,073,871

MAIN STORAGE ACCESS PRIORITY CONTROL SYSTEM THAT CHECKS BUS CONFLICT CONDITION AND LOGICAL STORAGE BUSY CONDITION AT DIFFERENT CLOCK CYCLES

Nobuo Uchida; Yuji Oinaga, both of Tokyo, and Mikio Itoh, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 19, 1988, Ser. No. 246,087
Claims priority, application Japan, Sep. 19, 1987, 62-233704; Oct. 12, 1987, 62-256794; Dec. 10, 1987, 62-314745
Int. Cl.[5] G06F *13/18, 13/36, 12/06*
U.S. Cl. 395—425 **11 Claims**



1. An access priority control system for a main storage for a computer, for controlling a signal transmission to the main storage upon receiving a plurality of storage access requests from at least one processor related to the main storage, said system comprising:

first access request port means for holding at least temporarily a segment address of the storage access requests from the processor;

first control means responsive to the output of said first access request port means for checking bus conflict conditions determined by the address of the storage access request;

second access request port means responsive to the output of said first control means for holding at least temporarily an intra-segment of said storage access request; and

second control means responsive to the output of said second access request port means for checking logical storage busy conditions in the storage segments in different clock cycles than the checking of the bus conflict conditions by said first control means.

5,073,872

DATA OUTPUT CONTROL CIRCUIT FOR SEMICONDUCTOR STORAGE DEVICE

Masami Masuda, Kawasaki, and Kenichi Nakamura, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

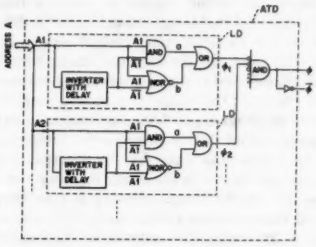
Filed Jul. 12, 1990, Ser. No. 551,303
Claims priority, application Japan, Jul. 12, 1989, 1-179814
Int. Cl.[5] G11C *7/00, 11/409*
U.S. Cl. 365—189.05 **15 Claims**

1. A data output control circuit for a semiconductor storage device comprising:

equalizing means connected between first and second data lines for setting said first and second data lines at a predetermined equal potential by making said first and second data lines conductive with respect to each other by applying an equalizing pulse to a control terminal, data corresponding to data stored in a memory cell selected according to an address being outputted to said first and second data lines;

output buffer switching means having first and second output switching means connected in series between a power source supply terminal and ground, an interconnection node between said output switching means being a data output terminal, and one and the other of said pair of data lines being connected to one and the other of the control nodes of said first and second output switching means;

data line switching means connected between said equaliz-



ing means and said output buffer switching means at least one of said pair of data lines, said data line switching means being turned on and off by said equalizing pulse; and

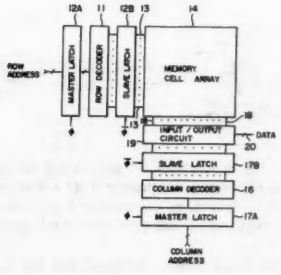
latch means connected between said data line switching means and correspondingly connected ones of said output switching means at said data lines for latching the potentials at said data lines immediately before the turn-off of said data line switching means and applying said latched potentials to the control terminals of said output switching means.

5,073,873

SEMICONDUCTOR MEMORY DEVICE

Kazutaka Nogami, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 21, 1989, Ser. No. 439,870
Claims priority, application Japan, Nov. 21, 1988, 63-294401
Int. Cl.[5] G11C *8/00*
U.S. Cl. 365—189.05 **18 Claims**



1. A semiconductor memory device comprising:

a master latch circuit operative to receive a row address signal to latch said row address signal at the first half of one cycle of a synchronizing signal, and to output said row address signal as it is at the latter half of one cycle of said synchronizing signal;

a row decoder operative to receive the row address signal outputted from said master latch circuit to decode it into a row decoded signal, to thus output said row decoded signal;

a slave latch circuit operative to receive the row decoded signal outputted from said row decoder to latch said row decoded signal at the latter half of one cycle of said syn-

chronizing signal, and to output said row decoded signal as it is at the first half of one cycle of said synchronizing signal, to thus drive one of a plurality of word lines; and

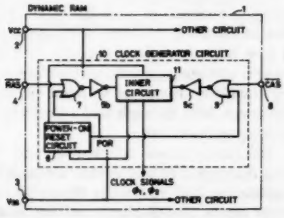
a memory cell array including a plurality of memory cells connected to said word lines, respectively, each memory cell being operative to carry out input/output operation of data when a word line to which said each memory cell is connected is driven.

5,073,874

METHOD OF AND APPARATUS FOR REDUCING CURRENT OF SEMICONDUCTOR MEMORY DEVICE

Michihiro Yamada, and Hiroshi Miyamoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 223,693, Jul. 22, 1988, Pat. No. 4,933,902. This application Oct. 4, 1989, Ser. No. 417,127
Claims priority, application Japan, Jul. 23, 1987, 62-185297
The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.
Int. Cl.[5] G11C 11/406, 5/14
U.S. Cl. 365—226 56 Claims



1. A semiconductor memory device operative in a first operating state and a second operating state and requiring an initial surge current upon initial power application thereto that is higher than a steady-state operating current requirement of said semiconductor memory device, wherein said memory device consumes more current in said first operating state than in said second operating state, reading and writing operations of said memory device being inhibited in said second operating state, said semiconductor memory device comprising:

at least one memory cell for storing data

first control means responsive to an external control signal for controlling said memory device to operate selectively in said first and second operating states;

detector mans for detecting an application of power to said memory device;

generating means responsive to said detector means for generating a power-on reset pulse signal defining said second operating state of said memory device for a predetermined time period initiated upon said detector means detecting application of power to said memory device; and

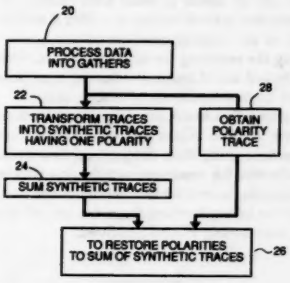
second control means responsive to the external control signal and to said power-on reset pulse signal for selectively operating said memory device in said first and second operating states whereby said memory device is operated in said second operating state both in response to application of power thereto and in response to said external control signal to reduce an initial current requirement of said memory upon initial power application thereto.

5,073,875

METHOD OF ENHANCING GEOPHYSICAL DATA

Michael C. Kelly, Sand Springs, and Richard O. Lindsay, Tulsa, both of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Nov. 15, 1990, Ser. No. 613,193
Int. Cl.[5] G01V 1/28
U.S. Cl. 367—38 16 Claims



1. A method for enhancing geophysical data, comprising the steps of:

(a) sorting the geophysical data into ordered gathers of seismic signals;

(b) transforming each seismic signal into a synthetic trace having only one polarity; and

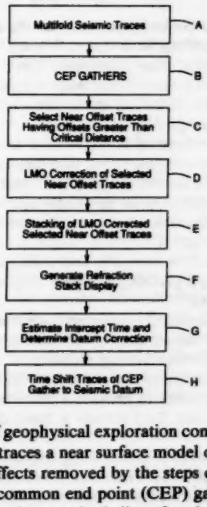
(c) combining the synthetic traces of each gather to form an enhanced trace for identifying and evaluating variations in the earth's subsurface formations.

5,073,876

GEOPHYSICAL EXPLORATION USING NEAR SURFACE STRUCTURE CORRECTIONS DEVELOPED FROM COMMON ENDPOINT GATHER STACKED TRACES

Russell L. Propes, Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.

Filed Dec. 31, 1990, Ser. No. 636,641
Int. Cl.[5] G01V 1/36
U.S. Cl. 367—54 15 Claims



1. A method of geophysical exploration comprising generating from seismic traces a near surface model of the earth having weathering effects removed by the steps of:

(a) generating common end point (CEP) gathers of a set of seismic traces along a seismic line of exploration, the set of

seismic traces having refraction first arrivals at source-receiver offsets greater than a crossover distance;

(b) selecting a set of traces from each CEP gather having source-receiver offsets greater than the crossover distance, first arrivals in the selected traces thus representing refraction first arrivals;

(c) generating for each selected set of traces a refraction stacked trace by linear moveout correcting each of the selected set of traces in each CEP gather so that each refraction first arrival occurs at a time it would have for a receiver at zero source-receiver offset;

(d) stacking the resulting linear moveout corrected traces of each selected set of traces producing a refraction stacked trace for each selected set of traces; and

(e) determining first break intercept times from the resulting refraction stacked traces and time shifting traces of the CEP gathers using thus determined first break intercept times effective for removing weathering effects therefrom and generating a near surface model of the earth along the seismic line of exploration from the sets of seismic traces having weathering effects removed.

5,073,877

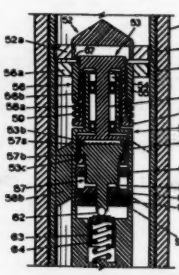
SIGNAL PRESSURE PULSE GENERATOR

John D. Jeter, St. Martinville, La., assignor to Schlumberger Canada Limited, Calgary, Canada

Division of Ser. No. 506,453, Apr. 9, 1990, which is a continuation of Ser. No. 330,791, Mar. 30, 1989, abandoned, which is a division of Ser. No. 865,083, May 19, 1986, Pat. No. 4,825,421. This application May 16, 1990, Ser. No. 524,172

Int. Cl.[5] H04M *9/00*

U.S. Cl. 367—84 **17 Claims**



1. Apparatus for use in a pipe string having a bore suspended in a well with a drilling fluid stream flowing in said bore, said apparatus generating time distributed fluid pressure change signals in said fluid stream in response to signals from a downhole instrument for detection at the surface of said well, the apparatus comprising:

(a) a housing with means at each end to attach to a continuing portion of said pipe string, said housing including fluid channel means therein to conduct at least a portion of said fluid stream between an upwardly continuing portion of said pipe string and a downwardly continuing portion of said pipe string;

(b) a stator fixedly mounted to and within said housing, said stator having a plurality of stator blades projecting radially therefrom;

(c) an arbor rotationally mounted within said housing adjacent to said stator, said arbor having a rotor mounted thereon, said rotor having plurality of rotor blades projecting radially therefrom, said stator blades and said rotor blades cooperating to provide a rotational torque to said arbor when said fluid stream is conducted through said housing;

(d) arbor, said control means being responsive to said signals from said a downhold instrument to control the amount of time said stator blades and said rotor blades are in streamline registry and streamline interference with one another, thereby generating said time distributed fluid pressure change signals in said fluid stream.

5,073,878

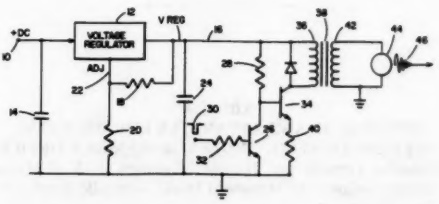
CIRCUIT FOR DRIVING AN ACOUSTIC TRANSDUCER

Ian R. Gilchrist, Timonium, Md., assignor to Cyber Scientific, Baltimore, Md.

Filed Oct. 31, 1990, Ser. No. 606,551

Int. Cl.[5] H04B *1/02*

U.S. Cl. 367—137 **5 Claims**



1. A circuit for driving an acoustic transducer, said transducer responsive to a step function signal to produce an acoustic frequency output, said circuit comprising:

a voltage regulator for providing a regulated DC output level across a high impedance load, and further responsive to a low impedance load, to provide a substantially reduced DC output;

transformer means connected between said voltage regulator and said acoustic transducer;

switch means connected to said transformer means and responsive to a leading transition of a pulse input signal to apply a low impedance load through said transformer means to said voltage regulator, and further responsive to a lagging transition of said pulse input signal to apply a high impedance load through said transformer means to said voltage regulator; and

capacitive reactance means coupled to said transformer means and responsive to said switch means application of a low impedance load, to rapidly discharge through said transformer means, said discharge causing said transducer means to generate an acoustic frequency output, and further responsive to said switch means application of said high impedance load, to accept charge from said voltage regulator, thereby applying a gradually increasing potential to said transformer means which is insufficient to cause said transducer means to produce an acoustic frequency output.

5,073,879

INFORMATION PROCESSING APPARATUS USING A BEAM SPLITTING MEANS HAVING NON-POLARIZATION BEAM SPLIT SURFACE

Hiddeo Andō, Kawasaki, and Yuichi Nakamura, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 27, 1990, Ser. No. 515,560

Claims priority, application Japan, Apr. 28, 1989, 1-110107

Int. Cl.[5] G11B *11/12, 7/14, 13/04*

U.S. Cl. 369—13 **18 Claims**

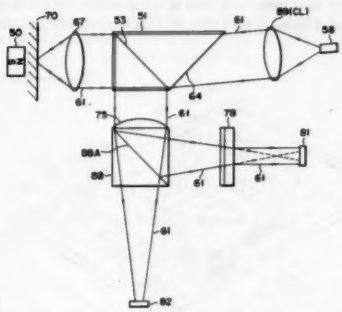
1. An information processing apparatus comprising:

means for generating a light beam;

converging means for converging the light beam generated by said light beam generating means on an information recording medium;

splitting means having a non-polarization beam split surface disposed between said light beam generating means and said information recording medium for splitting the light beam reflected from said information recording medium into split light beams having S and P polarized light components, the non-polarization beam split surface having

reflectances Rs and Rp with respect to the S and P polarized components or transmittances Ts and Tp with respect to the S and P polarized components, wherein the ratio



Ts/Tp falls within a range of $\frac{1}{2}$ to 2 or the ratio Rs/Rp falls within a range of $\frac{1}{2}$ to 2; and

means for detecting one of the split light beams.

5,073,880

INFORMATION RECORDING/REPRODUCING METHOD AND APPARATUS

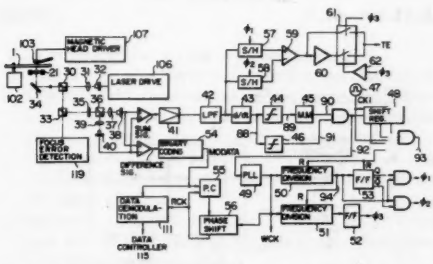
Takeshi Maeda, Kokubunji, and Yoshito Tsunoda, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,584

Claims priority, application Japan, Dec. 18, 1987, 62-318820; Mar. 10, 1988, 63-54851

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—32 **15 Claims**



1. An information recording/reproducing apparatus for recording and/or reproducing information on or from a recording medium on which wobbling prepits are intermittently provided along each track in a pattern wobbling alternately across the track center with a very small displacement therefrom, wherein data recording areas are defined between said wobbling prepits with a synchronizing prepit being provided for every predetermined number of pairs of said wobbling prepits, comprising:

a head for illuminating said data recording area on said recording medium with a light beam;

a servo system including a track deviation detecting circuit for obtaining a tracking signal by detecting said wobbling prepits through sampling with said light beam;

a control circuit for performing control operation in accordance with said tracking signal such that said light beam follows said track; and

positional information detecting means for detecting track address information for access by detecting the phase of said wobbling prepits in accordance with a signal obtained from said synchronizing prepits.

5,073,881

OPTICAL DISC APPARATUS WITH RAPID AND STABLE ACCESSING CAPABILITY

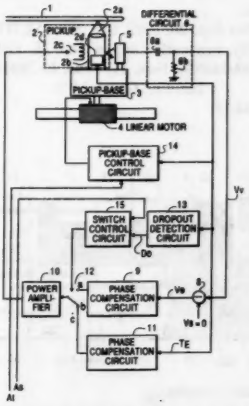
Ryo Akiyama, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 21, 1988, Ser. No. 209,642

Claims priority, application Japan, Jun. 24, 1987, 62-156798; Sep. 2, 1987, 62-219502

Int. Cl.[5] G11B *7/085*

U.S. Cl. 369—32 **9 Claims**



1. An optical disc apparatus comprising:

pickup means for forming a light spot on an optical disc and detecting a light from said optical disc, said pickup means including (a) a focus lens, and (b) a fine actuator for movably supporting thereon said focus lens and moving said focus lens;

light spot positioning means for positioning said light spot on said optical disc, said light spot positioning means constituting an optical servo loop including (a) position error detection means for detecting a position error of said light spot and producing a position error signal indicative of the detected position error of said light spot, (b) first phase compensation means for compensating a phase of said position error signal to obtain a phase-compensated position error signal, and (c) means for feeding said phase-compensated position error signal to said fine actuator;

traversing means for moving said pickup means in a radial direction of said optical disc, said traversing means being responsive to an externally given access order signal applied thereto in an access operation mode for moving said pickup means at a high speed to a desired position;

velocity control means for controlling a velocity of said focus lens, said velocity control means constituting a velocity servo loop including (a) velocity detection means for detecting a velocity of said focus lens and producing a velocity signal indicative of the velocity of said focus lens, (b) velocity error signal producing means for velocity signal indicative of the velocity of said focus lens, (b) velocity error signal producing means for comparing the velocity signal with a predetermined reference velocity to produce an error therebetween as a velocity error signal, (c) second phase compensation means for compensating a phase of the velocity error signal to obtain a phase-compensated velocity error signal, and (d) means for feeding said phase-compensated velocity error signal to said fine actuator; and

switching means selectively operable in one of a first mode for closing said optical servo loop and opening said velocity servo loop, a second mode for closing said velocity servo loop and opening said optical servo loop, and a third mode for opening both said optical and velocity servo

loops, wherein said switching means operates in said third mode for a first predetermined period of time immediately after said traversing means has stopped moving at the high speed, thereafter operates in said second mode for a second predetermined period of time, and thereafter operates in said first mode.

5,073,882

SERVO-CONTROLLED ACTUATOR WITH TWO-PEAK FLUX DENSITY DISTRIBUTION

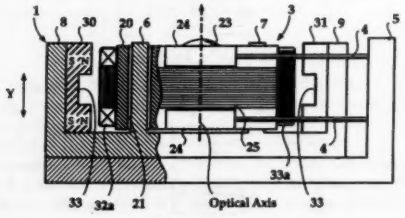
Yoshinori Sasaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 26, 1989, Ser. No. 412,717

Claims priority, application Japan, Sep. 26, 1988, 63-241434; Oct. 21, 1988, 63-266534; Nov. 11, 1988, 63-285105

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.15 **15 Claims**



1. An actuator comprising:

magnetic flux generating means mounted on a base, said magnetic flux generating means producing a magnetic flux density distribution having two peaks of equal magnitudes, said two peaks being located symmetrically on opposite sides of a center axis of said distribution and arranged in a first direction perpendicular to said center axis; and

a pair of first coils and a second coil mounted on a support resiliently movable with respect to the base, said first coils having first coil sections which cooperate with said magnetic flux generating means to generate force components contributing to movement of said support in a second direction perpendicular to said first direction and second coil sections which cooperate with said magnetic flux generating means to generate force components not contributing to the movement of said support in said second direction, the second coil sections of said first coils being located respectively at said peaks of the magnetic flux density distribution, said second coil cooperating with said magnetic flux generating means to produce a force component that moves said support in said first direction.

5,073,883

OBJECTIVE LENS DRIVING APPARATUS INCLUDING PARALLALOGRAM STRUCTURE

Koji Mitsumori, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 29, 1989, Ser. No. 291,950

Claims priority, application Japan, Jan. 27, 1988, 63-016271; Jan. 29, 1988, 63-019396

Int. Cl.[5] G11B *7/09*

U.S. Cl. 369—44.15 **28 Claims**

1. An objective lens driving apparatus comprising:

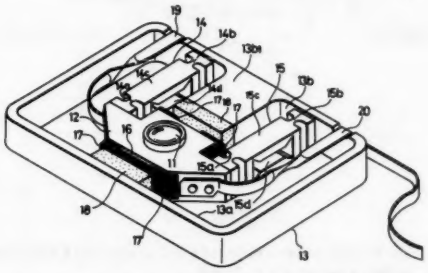
a movable body connected to and supporting an objective lens having an optical axis;

electromagnetic driving means connected to said objective lens for driving said objective lens in a direction parallel to the optical axis and in a direction perpendicular to the optical axis;

first and second supporting members each having a pair of hinge portions and first and second parallel links coupling said pair of hinge portions; and

a frame to which said first and second supporting members are attached;

wherein said objective lens is constrained by the respective parallel links of said first and second supporting members



to move in a direction parallel to the optical axis and wherein said movable body, a part of said frame and said first and second supporting members are connected to form a parallelogram structure and said objective lens is constrained by said parallelogram structure to move in a direction perpendicular to the optical axis.

5,073,884

TRACKING APPARATUS HAVING MOVABLE AND STATIONARY PARTS

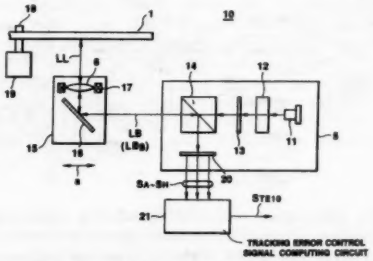
Yuhei Kobayashi, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 29, 1989, Ser. No. 459,199

Claims priority, application Japan, Jan. 17, 1989, 1-3710[U]

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.37 **3 Claims**



1. A tracking control apparatus for use with an optical recording and/or reproducing apparatus comprising:

a stationary optical section;

a laser light source mounted on said stationary optical section for producing three laser beams;

a movable optical section;

an objective lens mounted on said movable optical section by means of which the three laser beams irradiate an optical disk for reflection therefrom as three reflected laser beams;

a plurality of photodetectors each having a light receiving surface divided into at least two segments adapted to receive the three reflected laser beams, said segments producing respective detection output signals; and

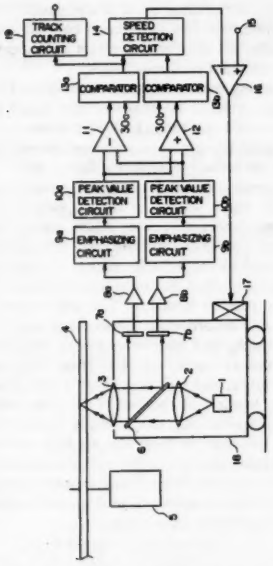
tracking control signal computing means responsive to said detection output signals for producing plural tracking error signals and for normalizing said tracking error signals on the basis of the total light quantities received by said photodetectors to derive a tracking control signal.

5,073,885

OPTICAL MEMORY DISC DRIVING APPARATUS

Osamu Ito, and Shigeo Hayashi, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 237,222
Claims priority, application Japan, Aug. 31, 1987, 62-218893
Int. Cl.[5] G11B 7/085
U.S. Cl. 369—44.28 7 Claims



1. In an optical disc driving apparatus comprising:

an optical head which position-controls optics that directs a light spot onto, and senses its reflection from, a track or a guide groove or between said guide grooves on an optical disc, so an optical sensor can reproduce information recorded on said track, and means for providing an error information signal regarding the position of said light spot relative to said track;

a head moving mechanism for moving a part of said optical head in a radial direction of said optical disc when accessing a destination track;

an access control system which controls the speed and direction of said head moving mechanism when moving toward a destination track;

said access control system comprising;

input emphasizing circuits for compensating lowering of a gain-frequency characteristic of the information signal reproduced by the optical sensor;

peak detection circuits for detecting envelopes of output signals of said emphasizing circuits respectively;

comparators for converting said output signals of said peak detection circuits into digital signals, respectively; and

a track count circuit for detecting the number of tracks traversed on the basis of the output signal of one of said comparators;

a tracking servo to maintain said light spot on said track;

means for coupling said error information signal to said input emphasizing circuits of said access control system; and

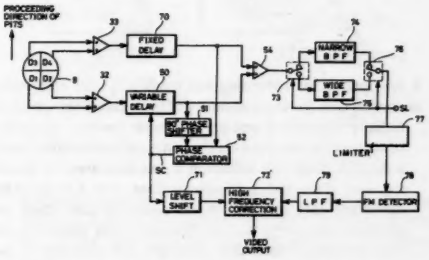
means for coupling said error information signal to said tracking servo, said tracking servo being separate from and bypassing said access control system.

5,073,886

SIGNAL REPRODUCING CIRCUITRY AND SIGNAL REPRODUCING METHOD FOR OPTICAL DISC PLAYER

Tooru Sasaki, Matsubara, and Nobukazu Hosoya, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Mar. 10, 1989, Ser. No. 321,821
Claims priority, application Japan, Mar. 11, 1988, 1-58614
Int. Cl.[5] H01G 4/20; H04J 3/00
U.S. Cl. 369—60 13 Claims



1. A circuitry for irradiating a medium on which information is recorded, in the form of pits, with a light beam and for reproducing said information by light reflected from said recording medium, wherein said pits are arranged on said recording medium to form recording tracks, said circuitry comprising:

converting means for converting said reflected light from said recording medium into electrical signals, said converting means including a first photoelectric converting means receiving said reflected light from a preceding side of said recording medium with respect to a direction of reproduction of information on said recording tracks and second photoelectric converting means receiving said reflected light from a succeeding side of said recording medium with respect to said direction of reproduction of information on said recording tracks;

delaying means for delaying an output from said first photoelectric converting means by a delay time, the delay time of said delaying means being variable;

time difference detecting means for detecting a time difference between an output from said second photoelectric converting means and an output form said delaying means and for outputting a signal corresponding to the detected time difference; and

control means, response to an output signal from said time difference detecting means, of changing the delay time of said delaying means; and

reproducing means for reproducing said information by using an output of said delaying means and an output from said second photoelectric converting means,

wherein said recording medium is a rotatable optical disc and said control means sets the delay time of said delaying means at L/2v where L represents a diameter of said light beam irradiating said optical disc and v represents a linear velocity of said optical disc at a position irradiated with said light beam.

5,073,887

OPTICAL DISK RECORDING AND READING SYSTEM WITH DIRECTORY DATA ACCESS MECHANISM

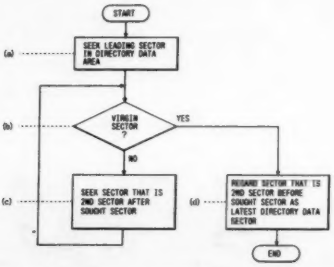
Yuji Takagi; Isao Satoh; Makoto Ichinose; Yoshihisa Fukushima, all of Osaka, and Yuzuru Kuroki, Sapporo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jun. 28, 1989, Ser. No. 372,587

Claims priority, application Japan, Jun. 28, 1988, 63-160079

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—100 **5 Claims**



1. An optical disk recording and reading system comprising:

an optical disk having a plurality of circular tracks which are radially adjacent to one another each having a succession of sectors for storing data therein, said optical disk having a data file structure including a user data area for recording user data and a directory data area for recording directory data relating to the recorded user data, said directory data area having directory data recording sectors positioned such that they are not adjacent to each other in a radial direction transverse to said tracks; and

a directory data access mechanism for accessing directory data recorded in said directory data area.

5,073,888

OPTICAL PICKUP DEVICE

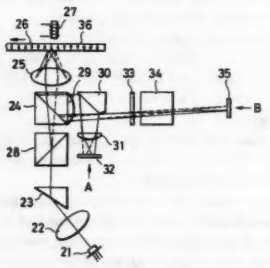
Yoshitaka Takahashi, Yokohama; Hiroshi Koide, Machida; Hiroshi Gotoh, Kawasaki; Masami Emoto, and Syuichi Honda, both of Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 340,044

Claims priority, application Japan, Apr. 21, 1988, 63-99062; Jul. 20, 1988, 63-180722; Aug. 5, 1988, 63-195756; Aug. 5, 1988, 63-195757

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—112 **7 Claims**



1. A magneto-optical pick-up device, comprising:

a sole semiconductor laser beam source for emitting a sole luminuous flux;

a beam dividing element for receiving said luminous flux emitted from said laser beam source and for dividing said received luminous flux into first and second emitted luminous fluxes;

a polarization-plane tilting means for tilting a plane of polarization of said first and second emitted luminous fluxes with respect to an optical axis of said beam dividing element to thereby cause said first and second emitted luminous fluxes to have light intensities which are different from each other;

a sole object lens for receiving said first and second emitted luminous fluxes and for converging said first and second emitted luminous fluxes into two respective small spots positioned at the same track of a magneto-optical recording medium, said first and second emitted luminous fluxes being reflected from said medium as respective first and second reflected luminous fluxes;

a beam splitting means disposed on an optical path between said beam dividing element and said object lens for separating the first and second emitted luminous fluxes which are incident on said beam splitting means from said first and second reflected luminous fluxes; and

a power varying means for varying a power parameter of said laser beam source in such a manner that: (i) in a recording mode, said laser beam source operates at a recording power output and said first emitted luminous flux is used to record information on the medium while said second emitted luminous flux has lower intensity than the first emitted luminous flux and is used to validate information recorded on the medium; and (ii) in a reproducing mode, said laser beam source operates at a reproducing power output which is lower than said recording power output and said first emitted luminous flux has an intensity lower than the that of the first emitted luminous flux in the recording mode and is used to reproduce recorded information from the medium while the second emitted luminous flux in the reproducing mode to thereby protect a coercive force of said magneto-optical recording medium from an effect of said second emitted luminous flux in the reproducing mode.

5,073,889

OPTICAL DISK CASE ASSEMBLY

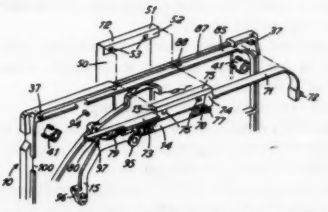
Adrien P. Rayner, Malmesbury, United Kingdom, assignor to CMB Foodcan plc, Worcester, England

Filed Apr. 3, 1990, Ser. No. 503,776

Claims priority, application United Kingdom, Apr. 18, 1989, 8908691

Int. Cl.[5] G11B *3/70, 5/02, 23/03;* **B65D** *85/30*

U.S. Cl. 369—291 **6 Claims**



1. A case assembly for an optical disk comprising first and second case parts arranged to cooperate when assembled together to contain an optical disk, each of the first and second case parts having a window for permitting optical access to an optical disk located inside the case assembly, first and second shutters formed from metal and respective first and second slide members formed from a plastics material, each slide member being adapted to be fitted to its respective shutter and to be retained thereby slidably mounted on its associated case part prior to assembly together of the two case parts, and means formed on the slide members whereby on assembly together of the two case parts, the first and second slide members and first and second shutters are constrained to move together between

a closed position in which the shutters cover the windows of the case parts and an open position in which the shutters permit optical access through the windows of the case parts; the case assembly further including a locking lever pivotally mounted on a spindle formed on the first case part and provided with a head and a locking tooth, and biasing means for biasing the locking lever into a locking position, the locking lever being arranged so that, when it is in its locking position, the head of the locking lever protrudes through an opening in the periphery of the case assembly and the locking tooth of the locking lever engages a complementary locking tooth provided on the first slide member; wherein the first slide member is provided with a web and the locking lever is provided with a projection and wherein the web overlies the projection being in sliding engagement therewith so as to secure the locking lever to the first case part.

5,073,890

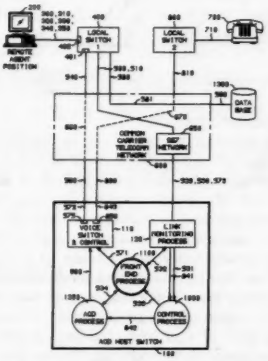
REMOTE AGENT OPERATION FOR AUTOMATIC CALL DISTRIBUTORS

Peter J. Danielsen, Wheaton, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 30, 1988, Ser. No. 292,190

Int. Cl.[5] H04J *3/08*; H04M *3/60*

U.S. Cl. 370—58.2 **25 Claims**



1. An automatic call distributor (ACD) switching network service method of serving calls from a position of the ACD, the ACD controlled by an ACD process means of a first common carrier switching system, wherein the position is served by a second common carrier switching system, comprising the steps of:

establishing a switched voice and a data connection via the second switching system between the position and the first switching system;

under the control of the ACD process means, connecting incoming calls, from any switching system, to the voice connection between the first switching system and the position, for service by the position, and the position communicating with the ACD process means via the data connection in serving each call.

5,073,891

METHOD AND APPARATUS FOR TESTING MEMORY

Piyush G. Patel, Fremont, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Feb. 14, 1990, Ser. No. 479,624

Int. Cl.[5] G11C *29/00*

U.S. Cl. 371—21.3 **7 Claims**

1. A method of testing the integrity of an instruction cache of a microprocessor, comprising:

(a) dividing a data array of the instruction cache into a first partition and a second partition, wherein the first partition includes a first memory location and the second partition includes a second memory location;

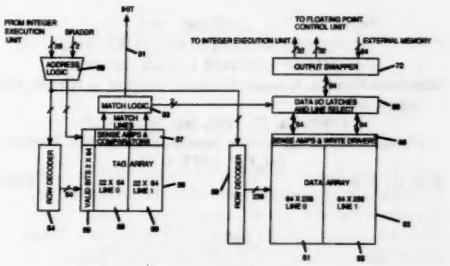
(b) loading an instruction-test instruction into the first memory location of the first partition and a test pattern into the second memory location of the second partition;

(c) applying the instruction-test instruction to an execution unit of the microprocessor and the test pattern to a control unit of the microprocessor;

(d) comparing the test pattern with a predetermined value;

(e) if the test pattern does not match the predetermined value, then issuing a signal indicative of a failure and stopping the testing, wherein the steps (c)–(e) are controlled by the instruction-test instruction; and

(f) if the test pattern matches the predetermined value, then performing a swap operation by loading the instruction-



test instruction into the second memory location of second partition and the test pattern into the first memory location of the first partition and performing the following steps;

(i) applying the instruction-test instruction from the second memory location of second partition to the execution unit of the microprocessor and the test pattern from the first memory location of the first partition to the control unit of the microprocessor;

(ii) comparing the test pattern read from the first memory location of the first partition with the predetermined value;

(iii) if the test pattern does not match the predetermined value, then issuing a signal indicative of a failure, wherein the steps (i)–(iii) are controlled by the instruction-test instruction.

5,073,892

SEMICONDUCTOR LASER DEVICE

Kazuhisa Uomi, Hachioji; Tsukuru Ohtoshi, Kokubunji; Tomonobu Tsuchiya, Kodaira; Shinji Sasaki, Komoro, and Naoki Chinone, Chofu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 7, 1990, Ser. No. 534,441

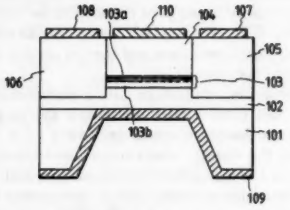
Claims priority, application Japan, Jun. 12, 1989, 1-146611; Dec. 4, 1989, 1-313303

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **21 Claims**

1. A semiconductor laser device comprising an active region for radiating light, means for injecting carriers into the active region, and a resonator for obtaining laser light from the radiated light, the active region having a potential well, the potential well comprising a region which does not fulfill the charge neutrality condition for free-carriers, and the optical output

power of the device being reduced by applying an electric field in such a direction as to enlarge the distance between the



position of electrons localized in the potential well and the position of holes localized in the potential well.

5,073,893

SEMICONDUCTOR STRUCTURE AND SEMICONDUCTOR LASER DEVICE

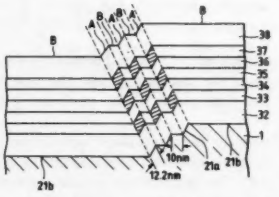
Masahiko Kondou, Kokubunji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 27, 1990, Ser. No. 545,288

Claims priority, application Japan, Jun. 29, 1989, 1-165464

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **7 Claims**



1. A semiconductor structure which has a substrate crystal having a plurality of crystal orientations and above said crystal is an atomic-layer superlattice in which different semiconductors are laminated one over another with a period in terms of atomic layers and which is made up of semiconductor layers each having a thickness of 1-atom to 5-atom layer, with at least a part of said atomic-layer superlattice having a different band gap than the remainder.

5,073,894

SEMICONDUCTOR LASER

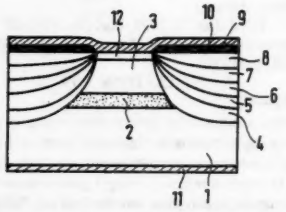
Klaus Wünstel, Schwieberdingen, and Reinold Weinmann, Esslingen, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Aug. 24, 1990, Ser. No. 571,994

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1989, 3929312

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—46 **5 Claims**



1. In a semiconductor laser, a layer structure comprising: at least one active region and at least one semi-insulating region on a semiconductor substrate, said at least one active region extending over part of the surface of the semiconductor substrate, and said at least one semi-insulating layer being disposed on both sides of the active region, wherein on both sides of the active region at least one n-type layer and one p-type layer are additionally provided one upon another adjacent to said at least one semi-insulating layer.

5,073,895

SEMICONDUCTOR LASER

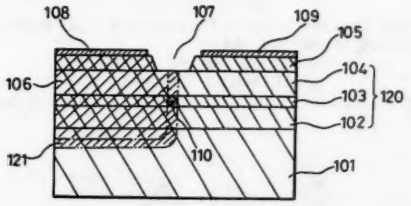
Etsuji Omura, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 15, 1990, Ser. No. 567,823

Claims priority, application Japan, Apr. 18, 1990, 2-102636

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—47 **14 Claims**



1. A transverse junction stripe semiconductor laser comprising:

a semiconductor substrate;

a double heterostructure including, successively disposed, a semiconductor first cladding layer of a first conductivity type having a first energy band gap, a semiconductor active layer of the first conductivity type having an energy band gap smaller than that of said first semiconductor layer, and a semiconductor second cladding layer of the first conductivity type having an energy band gap larger than that of said second semiconductor layer, said first cladding layer being disposed on said substrate;

an impurity region of a second conductivity type extending through part of said first cladding, active, and second cladding layers and producing the second conductivity type in the part of said first cladding, active, and second cladding layers through which the region extends wherein said first cladding, active, and second cladding layers are AlGaInAs;

a semiconductor contact layer including first and second portions, said first portion being disposed on said second cladding layer on said impurity region and said second portion being disposed on said second cladding layer outside said impurity region; and

first and second electrodes respectively disposed on said first and second portions of said contact layer.

5,073,896

PURIFICATION OF LASER GASES

John Reid, Stittsville; Robert K. Brimacombe, Kanata, and Edward S. Williams, Nepean, all of Canada, assignors to Lumonics Inc., Kanata, Canada

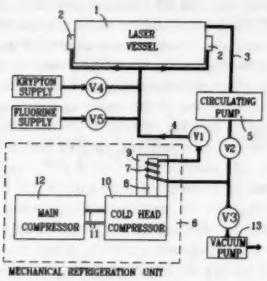
Filed Apr. 18, 1991, Ser. No. 687,028

Int. Cl.[5] H01S *3/22*

U.S. Cl. 372—59 **25 Claims**

1. In a method of purifying a mixture of gases in the vessel of a laser, said mixture comprising at least one buffer gas, a rare lasing gas, a halogen lasing gas, and at least one impurity gas, the steps of withdrawing the mixture from the vessel and subjecting the withdrawn mixture to a temperature sufficiently low to substantially condense all of the impurity gases, but high enough to leave the buffer gas substantially all in gaseous form,

removing the condensed gases, and resupplying the mixture with any lasing gas required to enable the laser to operate, the



vessel remaining sealed during the carrying out of the foregoing steps whereby the buffer gas that was in the mixture prior to said steps remains therein for reuse.

5,073,897

GASES TO BE USED FOR CO_2 LASER OPERATION AND PROCESS OF OPERATING WITH CO_2 LASER

Jean-Pierre Larue, Montreal, Canada; Bruno Marié, Le Mesnil St Denis, France; Christine Marot, Versailles, France; Lahcen Ougarane, Montigny le Bretonneux, France, and Philippe Van der Have, Johannesburg, South Africa, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude Et L'Exploitation Des Procedes Georges Claude, Paris, France

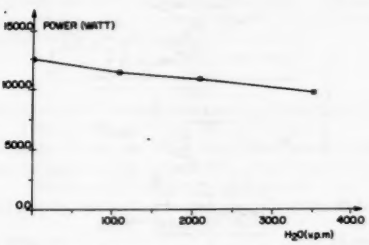
PCT No. PCT/FR89/00486, § 371 Date Apr. 13, 1990, § 102(e) Date Apr. 13, 1990, PCT Pub. No. WO90/03676, PCT Pub. Date Apr. 5, 1990

PCT Filed Sep. 25, 1989, Ser. No. 477,836

Claims priority, application France, Sep. 26, 1988, 88 12527

Int. Cl.[5] H01S *3/22*

U.S. Cl. 372—59 **8 Claims**



1. Premixed gas for laser operation, of the type containing at least helium, nitrogen and carbon dioxide (CO_2) said premixed gas having a purity less than 99.995%, a water content less than 5 parts per million by volume and a total hydrocarbon content less than 5 parts per million by volume.

5,073,898

COMMUNICATION DEVICE

Mamoru Endo, and Masahiro Hamatsu, both of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1990, Ser. No. 472,089

Claims priority, application Japan, Feb. 7, 1989, 1-29539

Int. Cl.[5] H04L *27/30*

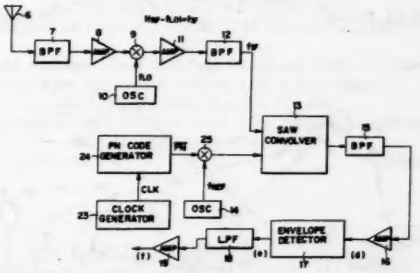
U.S. Cl. 375—1 **6 Claims**

3. A communication receiver circuit comprising:

means for receiving a spread-modulated signal provided by spread-modulating a carrier signal amplitude modulated with information signals by using a pseudo-noise code;

spread-modulating means for spread-modulating a locally generated reference carrier signal having a center frequency which is at least approximately equal to the central frequency of a spread-modulated signal thus received by using a reference pseudo-noise code inverted in time with respect to said pseudo-noise code;

surface acoustic wave convovler means for performing a convolution integration of sad received spread-modulated signal and said spread-modulated reference carrier so as to produce a correlated output signal correlating said received spread-modulated signal with said spread-modulated reference carrier;



envelope detector means for envelope-detecting said correlated output signal outputted by said convolver means so as to produce output signals in the form of a series of pulses of common polarity and varying height, the peaks of successive pulses tracing out in time the information contained in said received carrier; and

demodulating means for demodulating envelope-detected signals from said envelope detector means to obtain said information signal by filtering said envelope detector output signals to remove frequency components lying above those of said information signals.

5,073,899

TRANSMISSION SYSTEM FOR SENDING TWO SIGNALS SIMULTANEOUSLY ON THE SAME COMMUNICATIONS CHANNEL

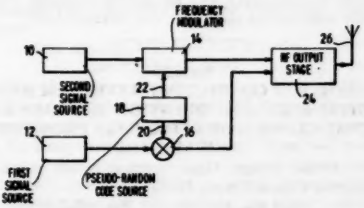
Christopher J. Collier, Carshalton Beeches, and Robert J. Murray, Horley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 12, 1989, Ser. No. 378,886

Claims priority, application United Kingdom, Jul. 13, 1988, 8816635

Int. Cl.[5] H04K *1/00*

U.S. Cl. 375—1 **17 Claims**



1. A method of transmitting first and second signals by the same transmitter on a single channel, comprising:

multiplying signals from a first signal source with a pseudo-random code to produce a spread spectrum signal,

producing a modulated second signal which is not a spread spectrum signal and which includes a synchronization signal for the pseudo-random code and other information,

combining the spread spectrum signal and the modulated

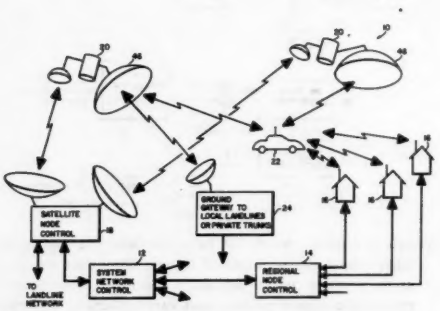
signal so that the modulated second signal lies within the bandwidth occupied by the spread spectrum signal, and transmitting the combined signals on a single communications channel.

5,073,900

INTEGRATED CELLULAR COMMUNICATIONS SYSTEM

Albert J. Mallinckrodt, 14141 Stratton Way, Santa Ana, Calif. 92705-3299

Filed Mar. 19, 1990, Ser. No. 495,497
Int. Cl.[5] H04L *27/30*
U.S. Cl. 375—1 **20 Claims**


SATELLITE NODE CONTROL
GROUND GATEWAY TO LOCAL LANDLINES OR PRIVATE TRUNKS
SYSTEM NETWORK CONTROL
REGIONAL NODE CONTROL
TO LANDLINE NETWORK

1. A cellular communications system comprising:

at least one space node having a multiple beam antenna positioned so to establish a first set of cells, each space node including means for transmitting and receiving different predetermined sets of code division multiple access coded, spread spectrum waveforms digitally modulated and incorporating forward error correction coding with the waveforms being located in a predetermined frequency band common to all space nodes;

at least one surface node positioned so to establish a second set of cells, each surface node including means for transmitting and receiving the predetermined sets of code division multiple access coded, spread spectrum waveforms in the predetermined frequency band;

a plurality of user units within the cells, each unit including means for communicating with said at least one space node and with said at least one surface node and being operatively responsive to a predetermined one of the sets of code division multiple access coded waveforms to thereby establish selective communication with at least one of the nodes; and

a network controller operationally connected with said at least one space node and with said at least one surface node to selectively allocate communications with said user units among said space and surface nodes.

5,073,901

METHOD FOR CORRECTING WAVEFORM DATA IN DIGITAL SIGNAL MODULATION AND BASE BAND SIGNAL GENERATOR USING DATA PROVIDED BY THIS METHOD

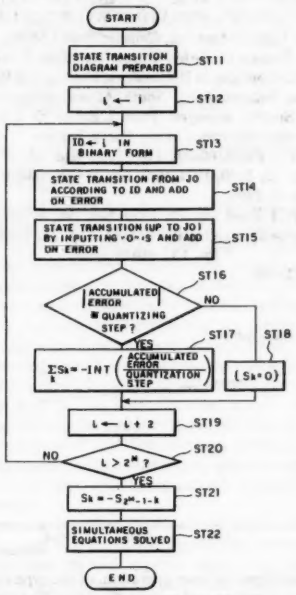
Yasushi Iwane, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1990, Ser. No. 555,703
Claims priority, application Japan, Aug. 10, 1989, 1-207349
Int. Cl.[5] H04B *14/04*
U.S. Cl. 375—26 **6 Claims**

1. A method for correcting digital signal modulation waveform data which corrects quantized waveform data stored in a waveform memory for generating a baseband waveform according to consecutive M-bit digital data, where number, stored in an element capable of accommodating said consecutive M-bit digital data, so as to reduce an accumulated error in an accumulated value of said quantized waveform data deviating from an accumulated value of said baseband waveform to within a predetermined value, comprising the steps of:

defining states, each of which corresponds to respective bit patterns of said consecutive M-bit digital data stored in said element, which outputs said quantized waveform data of a single bit interval, and defining one of the states as a first initial state corresponding to a bit pattern of all "0" bits and another one of the states as a second initial state corresponding to a bit pattern of all "1" bits;

generating binary data patterns, each of which begins with a respective odd number from one to (2^M-1) followed by a predetermined number of consecutive "0" bits necessary for reaching the bit pattern corresponding to said first initial state by shifting said respective data patterns, or each of which beginning with a complement of an odd number from one to (2^M-1) followed by a predetermined number of consecutive "1" bits necessary for reaching the bit pattern corresponding to said second initial state by shifting said respective data patterns;



computing said accumulated error along each of a number of state transition routes from said first or second initial states set in accordance with each of said data patterns generated above;

establishing simultaneous equations, corresponding to said routes, each left hand side of which is a sum of correction variables for said accumulated error computed along each state transition route, and each right hand side of which is a correction value for said quantized waveform data corresponding to said states existing along said state transition route subjected to computation;

determining states to be corrected concerning said quantized waveform data and the corresponding correction values by solving the simultaneous equations established after computing said accumulated errors along all the set routes; and

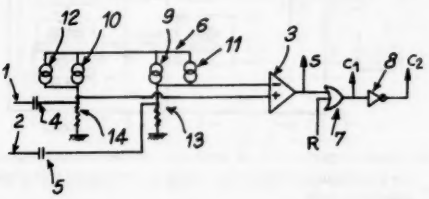
correcting said quantized waveform data in accordance with said correction values.

5,073,902

DEVICE FOR RECEIVING INFORMATION TRAVELLING ON TWO CAPACITIVELY COUPLED INFORMATION TRANSMISSION LINES, IN PARTICULAR FOR A MOTOR VEHICLE

Jean-Luc Lecocq, Sevres, France, assignor to Automobiles Peugeot, Paris; Automobiles Citroen, Neuilly/Seine and Regie Nationale des Usines Renault, Boulogne Billancourt, all of, France

Filed Jun. 15, 1990, Ser. No. 538,429
Claims priority, application France, Jun. 19, 1989, 89 08123
Int. Cl.[5] H04B *3/00*
U.S. Cl. 375—36 2 Claims



1. A device for receiving information travelling on capacitively coupled information transmission lines comprising:

a comparator, each input of which receives signals from an information transmission line through a capacitor;

means for forced switching of the comparator between a recessive state and a dominant state, the means for forced switching being interposed between the information transmission lines and the inputs of the comparator;

a protocol decoder for generating a reinitialization signal;

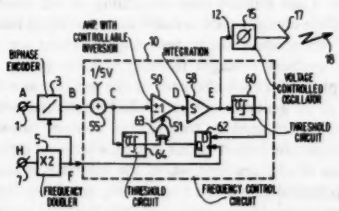
an OR gate, one input of the OR gate being one input of the OR gate being connected to an output of the comparator and another input of the OR gate being connected to the protocol decoder to receive a reinitialization signal from the protocol decoder, and an output of the OR gate being connected directly and through an invertor to the means for forced switching so that the means for forced switching reinitializes the comparator when the comparator is blocked in the dominant state.

5,073,903

INFORMATION TRANSMISSION ARRANGEMENT USING FREQUENCY MODULATION

François Magne, Paris, and Marc Chelouche, Sannois, both of France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Dec. 18, 1989, Ser. No. 452,859
Claims priority, application France, Dec. 27, 1988, 88 17229
Int. Cl.[5] H04L *27/10*
U.S. Cl. 375—45 15 Claims



1. Information transmission apparatus comprising:

a sending circuit, including an oscillator having a frequency control input, for forming a frequency modulated signal to be transmitted in response to a frequency control signal at said frequency control input; and

a frequency control circuit having an input for a digital input information signal, said frequency control circuit being for supplying said frequency control signal in a form to change a slope of frequency variation of the frequency modulated signal as a function of the state of said input information signal;

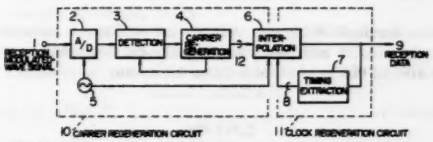
wherein the control circuit comprised means for determining a state of the frequency control signal, and a controllable sign inverting means having a non-inverting state and an inverting state for causing inversion of a sign multiplying the slope of frequency variation of the frequency modulated signal as a function of the states of said input information signal and said frequency control signal.

5,073,904

DIGITAL SIGNAL PROCESSING TYPE DEMODULATION METHOD AND DEMODULATION CIRCUIT

Shigeki Nakamura, and Yasufumi Takahashi, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 22, 1989, Ser. No. 354,918
Claims priority, application Japan, May 25, 1988, 63-125704
Int. Cl.[5] H03D *1/00;* H04L *27/06*
U.S. Cl. 375—94 9 Claims



5. A digital demodulation circuit comprising:

a digital processing carrier regeneration circuit for receiving a reception modulated-wave signal to regenerate and detect a carrier from said reception modulated-wave signal in synchronism with a sampling frequency to thereby generate a first signal;

an interpolation processing circuit for receiving said first signal, and for performing interpolation on said first signal and resampling said first signal in synchronism with a clock frequency established asynchronously with and independently of said sampling frequency to thereby generate a second signal; and

a clock regeneration circuit for receiving said second signal and for extracting a timing component from said second signal in synchronism with said clock frequency to thereby generate a reception data.

5,073,905

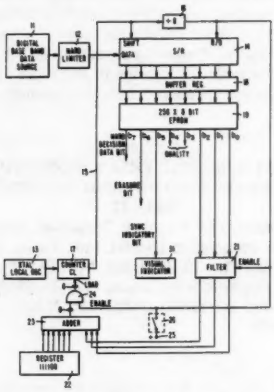
APPARATUS FOR AND METHOD OF SYNCHRONIZING A LOCAL OSCILLATOR TO A RECEIVED DIGITAL BIT STREAM

Mark Dapper, Cincinnati, and Terrance Hill, Fairfield, both of Ohio, assignors to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Aug. 22, 1989, Ser. No. 396,876
Int. Cl.[5] H04L *7/00*
U.S. Cl. 375—106 42 Claims

1. Apparatus for synchronizing an output of a local oscillator to received bits of a digital bit stream comprising means for sampling the binary value of each of the received bits several predetermined times during each of the received bits to derive for each received bit a several bit binary word representing the sampled values, and means responsive to the binary value of the several bit binary word for controlling the local oscillator synchronization, the synchronized local oscillator being connected to the means for sampling to control the occurrence times of the plural samples of each of the received bits so that the binary value of the several bit binary word, including several bit binary words having plural binary bit transitions, controls the oscillator synchronization and the sampling occurrence times to selectively cause more than one sample shift between successive received bits, the extent of the sample shift

being determined by estimates of the noise of each received bit of the digital bit stream and the relative phase difference between the digital bit stream and the local oscillator as indicated by the number and positions of binary bit transitions in the several bit binary word of a digital bit stream.



5,073,906

SYNCHRONIZATION WORD DETECTION APPARATUS

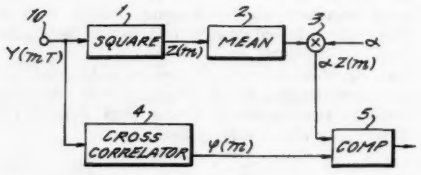
Susumu Otani, and Syouji Endo, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Dec. 6, 1990, Ser. No. 624,201

Claims priority, application Japan, Dec. 7, 1989, 1-319182

Int. Cl.[5] H04L *7/04*

U.S. Cl. 375—116 **2 Claims**



1. A synchronization word detection apparatus for receiving a signal in which a synchronization word having a predetermined length (N) is inserted beforehand and detecting said synchronization word out of a demodulated and soft-decided sequence of said received signal, said apparatus comprising:

cross correlation calculating means for calculating a cross correlation value of the demodulated and soft-decided sequence fed thereto and a stored synchronization word;

means for producing a detection signal when the cross correlation exceeds a thershold value; and

threshold generating means for determining a mean power of the demodulated and soft-decided sequence and generating said threshold value on the basis of said mean power.

5,073,907

DIGITAL PHASE-LOCK LOOP

Jess B. Thomas, Jr., La Canada, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Jan. 30, 1990, Ser. No. 472,607

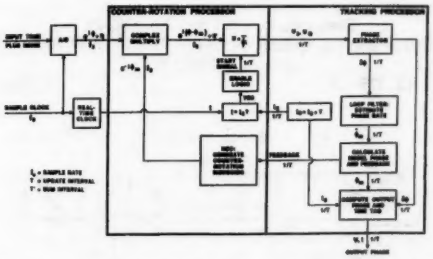
Int. Cl.[5] H03D *3/24*

U.S. Cl. 375—120 **20 Claims**

1. A digital phase-locked loop for tracking the phase of a signal supplied in the form of digital samples, comprising:

a) means responsive to feedback, for generating counter-rotation phase;

b) means for generating a counter-rotated signal in which said counter-rotation phase is subtracted from said phase of said signal;



c) means responsive to at least one counter-rotated signal, for generating residual phase with a normalized sine phase extractor; and

d) means responsive to said residual phase, for generating said feedback for the counter-rotation phase means.

5,073,908

READING REGISTERS OF THE CHARGE-COUPLED DEVICE TYPE WITH WIDE RANGE OF OUTPUT

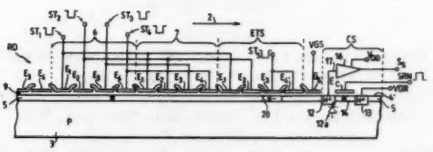
Yvon Cazaux, Grenoble, France, assignor to Thomson Composants Militaires et Spatiaux, Courbevoie, France

Filed Mar. 13, 1990, Ser. No. 492,753

Claims priority, application France, Mar. 28, 1989, 89 03986

Int. Cl.[5] G11C *19/28;* **H01L** *29/78*

U.S. Cl. 377—62 **4 Claims**



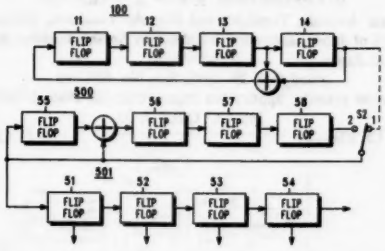
1. A reading register comprising a semiconductor substrate, a charge-coupled device type of shift register formed by a sequence of transfer stages, an output circuit placed in the vicinity of a last transfer stage according to the direction of transfer of the charges, each transfer stage having at least three mutually independent electrodes to which there are applied pulses of cyclical voltages forming transfer pulses having different phases for each electrode of one and the same transfer stage so as to generate in the substrate potential wells and potential barriers used to transfer the charges towards the output circuit, the output circuit having a terminal element for the storage of charges forming, in the substrate, a zone with floating potential connected to a reading amplifier, the terminal storage element being separated from the last transfer stage by an output gate beneath which there is formed a separation potential barrier, wherein, in the last transfer stage having at least three mutually independent electrodes two successive electrodes which are closest to the output gate are connected to each other and are controlled by one and the same output transfer pulse, these two mutually connected electrodes forming the second last and the last electrode of an output transfer stage in the charge transfer direction.

5,073,909

METHOD OF SIMULATING THE STATE OF A LINEAR FEEDBACK SHIFT REGISTER

Michael D. Kotzin, Buffalo Grove, and Alan L. Wilson, Hoffman Estates, both of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed Jul. 19, 1990, Ser. No. 554,510
Int. Cl.[5] G11C 5/06
U.S. Cl. 377—72 14 Claims



1. A method for simulating the state of a TYPE I Linear Feedback Shift Register (LFSR) from a TYPE II LFSR comprising the steps of:

clocking a TYPE II LFSR to produce an output sequence;

storing at least some of the output sequence in a storage medium; and

advancing the TYPE II LFSR and storage medium clocks to produce state information,

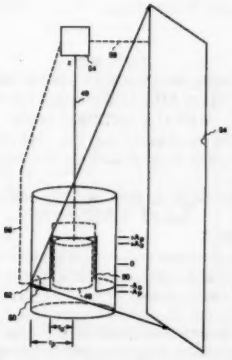
whereby the storage medium contains data corresponding to at least a partial state of a TYPE I LFSR.

5,073,910

SQUARE WAVE CONE BEAM SCANNING TRAJECTORY FOR DATA COMPLETENESS IN THREE-DIMENSIONAL COMPUTERIZED TOMOGRAPHY

Jeffrey W. Eberhard, and Kristina H. V. Hedengren, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 27, 1990, Ser. No. 572,651
Int. Cl.[5] G01N 23/00
U.S. Cl. 378—4 22 Claims



1. A scanning and data acquisition method for three-dimensional computerized tomography (CT) imaging of a field of view containing at least a portion of an object illuminated by a cone beam source, said method comprising:

defining a source scanning trajectory as a path traversed by said source;

employing the cone beam source fixed with reference to a two-dimensional array detector with both source and detector movably positioned relative to the object in order to scan about the object;

specifying the source scanning trajectory as a square wave on a cylindrical surface surrounding the field of view such that each plane passing through the field of view intersects the scanning trajectory in at least one point; and

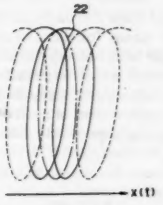
scanning at a plurality of positions along the source scanning trajectory to obtain cone beam projection data.

5,073,911

COMPUTERIZED TOMOGRAPHIC APPARATUS

Masahiro Ozaki, Ootawara, and Toshihiro Rifu, Nishinasunomachi, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 478,316, Feb. 12, 1990, abandoned.
This application May 28, 1991, Ser. No. 707,276
Claims priority, application Japan, Feb. 13, 1989, 1-31016
Int. Cl.[5] A61B 6/03
U.S. Cl. 378—17 10 Claims



1. A computerized tomographic apparatus comprising:

scanning means for moving an object in a direction, for producing and rotating radiation rays within a plane intersecting the direction of movement to perform a helical scan on said object, and for receiving a plurality of sets of projection data points, each set of projection data points corresponding to a 360° portion of a helix in the object;

first interpolation means, coupled to the scanning means, for calculating a set of output data points corresponding to a desired slice of the object, an output data point of the desired slice being calculated by determining a first projection data point from a first adjacent 360° portion of the helix and a second projection data point from a second adjacent 360° portion of the helix located on both sides of the desired slice, both projection data points having the same desired projection angle as that of the output data point, and by interpolating the distances between each of the first and second projection data points and a plane containing the desired slice to determine the output data point; and

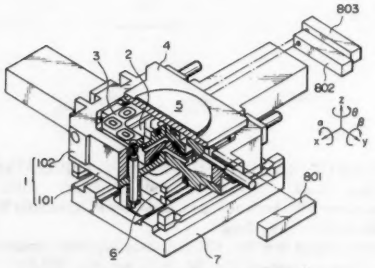
second interpolation means for calculating one of the projection data points if either set of projection data points corresponding to the first or second 360° portions of the helix does not include a projection data point having the desired projection angle by interpolating a third projection data point and a fourth projection data point, the third and fourth projection data points being located on the 360° portion of the helix which does not include a projection data point having the desired projection angle, and the third and fourth projection data point having projection angles adjacent to the desired projection angle.

5,073,912

SAMPLE MOVING APPARATUS, SAMPLE MOVING SYSTEM AND SEMICONDUCTOR MANUFACTURING APPARATUS

Isao Kobayashi; Yosuke Hamada, both of Ibaraki; Kenji Mori, Tsuchiura, and Hiromu Hirai, Tsukuba, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 14, 1989, Ser. No. 436,036
Claims priority, application Japan, Nov. 16, 1988, 63-287683
Int. Cl.[5] G71K *5/10*
U.S. Cl. 378—34 **18 Claims**



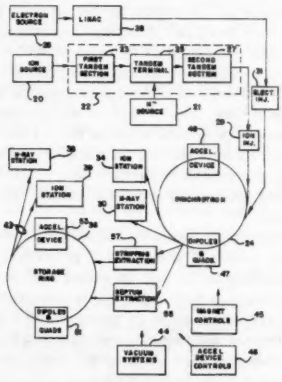
1. A sample moving apparatus comprising:
a fine adjustment actuator provided on a base;
a fine adjustment stage driven by said fine adjustment actuator;
a coarse drive mechanism provided on said base;
a coarse adjustment stage driven by said coarse drive mechanism; and hold means for attractively holding a sample table onto sample table bearing surfaces of said fine adjustment stage and said coarse adjustment stage, and
wherein said fine adjustment stage and said coarse adjustment stage are independent of each other and each of said adjustment stages is respectively directly mounted on said common base.

5,073,913

APPARATUS FOR ACCELERATION AND APPLICATION OF NEGATIVE IONS AND ELECTRONS

Ronald L. Martin, LaGrange, Ill., assignor to ACCTEK Associates, Inc., LaGrange, Ill.

Division of Ser. No. 186,183, Apr. 26, 1988, Pat. No. 4,992,746.
This application Oct. 31, 1990, Ser. No. 606,536
Int. Cl.[5] H05H *13/04*
U.S. Cl. 378—34 **11 Claims**



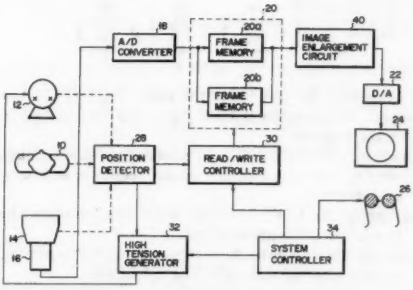
1. An apparatus for producing X-rays by electron synchrotron radiation and also beams of accelerated ions comprising: a) a source of ions; b) a source of electrons; c) an electron preaccelerator receiving and preaccelerating the electrons; d) an ion preaccelerator receiving and accelerating the ions; e) a synchrotron connected to the preaccelerators for accelerating electrons and ions to produce accelerated electrons and accelerated ions; f) a storage ring connected to the synchrotron to store accelerated electrons and ions; and g) a plurality of work stations utilizing beams of accelerated ions and X-rays.

5,073,914

STEREOSCOPIC X-RAY APPARATUS

Hiroshi Asahina, Tochighi, and Hiroshi Yasuhara, Ootawara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 29, 1990, Ser. No. 604,460
Claims priority, application Japan, Oct. 30, 1989, 1-282313
Int. Cl.[5] G21K *4/00*
U.S. Cl. 378—42 **11 Claims**



1. A stereoscopic X-ray apparatus comprising:
means for irradiating X-rays in two directions to an object to be examined;
means for picking-up images created by X-rays having passed said object to provide X-ray images picked-up in the two directions;
means for detecting the positional relation of the object with respect to said irradiation means and picking-up means; and
stereoscopic display means for adjusting the positional relation between two X-ray images output from said picking-up means according to the positional relation of said object detected by said detection means and stereoscopically displaying the X-ray images.

5,073,915

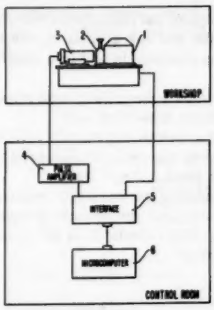
DENSITOMETER FOR THE ON-LINE CONCENTRATION MEASUREMENT OF RARE EARTH METALS AND METHOD

Cao Hong Zhang; Tao Lun Chang; Pan Yun De, all of Beijing, China, assignors to Beijing Institute of Nuclear Engineering, Beijing, China

Filed Apr. 2, 1990, Ser. No. 503,254
Int. Cl.[5] H03K *23/74*
U.S. Cl. 378—54 **9 Claims**

1. A method of on-line concentration measurement of multi-elements in solution, that comprises, generating successive pairs of similar energy monochromatic X-ray beams, each pair of beams having one of slightly higher and the other beam of slightly lower energy than the K or L orbital electron ionization energy absorption edge of one of the elements in solution, the concentration of which element is to be determined,; said generating comprising impinging radiation from a source upon successive different metal targets selected to correspond to the respective pairs of similar energies corresponding to each particular element the concentration of which in solution is to be determined, with the metal of the successive targets being selected for every two adjacent elements in the multi-element solution, arranged in order of atomic numbers, such that the

energy of the X-rays characteristic of of each target lies between the said absorption edges of two adjacent elements in solution; successively relatively moving said targets past the radiation source and in position to pass the target-generated rays through the solution; measuring the absorption difference by the successive elements in solution to the corresponding pair of X-ray beams to determine the concentration of that element in the solution; applying the measured absorption



differences to microprocessor means while programming the same to control the target movement and for enabling each of on-line successive measurement of the concentration of each successive element in solution, calibration and storage of such measurements and calculation to eliminate the contribution of other interfering elements from the successive elements to be measured, and display of the successive element concentrations.

5,073,916

CASSETTE UNLOADING AND RELOADING APPARATUS WITH FILM DETECTING SENSORS

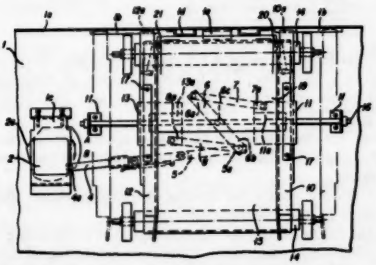
Bernd Mirlieb, Fellbach; Kurt Baumann, Ostfildern, and Heinz Killguss, Kornwestheim, all of Fed. Rep. of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

PCT No. PCT/EP88/00402, § 371 Date Nov. 8, 1989, § 102(e) Date Nov. 8, 1989, PCT Pub. No. WO88/09001, PCT Pub. Date Nov. 17, 1988

PCT Filed May 9, 1988, Ser. No. 445,861

Int. Cl.[5] G03B *42/02*

U.S. Cl. 378—181 **11 Claims**



4. Apparatus for unloading and loading X-ray cassettes in which film is enclosed between upper and lower cassette parts which are moved apart to an open position for unloading and loading film, and in which cassettes are positioned by guide means which engage the lateral edges of the cassette, the improvement comprising:

means mounted on said guide means for detecting the loaded/unloaded condition of the cassette and the film position if loaded, said detecting means comprising means for emitting and sensing radiation harmless to the film.

5,073,917

X-RAY EXAMINATION APPARATUS

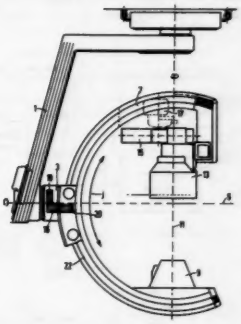
Johannes G. Van Endschot, and Cornelis M. Van Doorn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 15, 1990, Ser. No. 614,414

Claims priority, application Netherlands, Nov. 22, 1989, 8902885

Int. Cl.[5] H05G *1/02*

U.S. Cl. 378—197 **24 Claims**



1. An X-ray examination apparatus comprising:

a column;

a mount connected to the column and rotatable about an axis;

a C-shaped carrier journaled in the mount and which carries an X-ray source and an X-ray detector in facing relation, said carrier being displaceable in the mount along a segment of a circle;

carrier displacement means coupled to the mount including a drive shaft and a friction roller secured to the shaft for bearing against the carrier on a carrier contact face for displacing the carrier relative to the mount; and

coupling means secured to the mount for selectively coupling and decoupling said friction roller to said displacement means.

5,073,918

ANGLE DETECTOR DEVICE FOR SILICON WAFERS

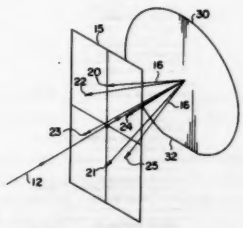
Kazuya Kamon, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 8, 1990, Ser. No. 564,163

Claims priority, application Japan, Feb. 13, 1990, 2-32809

Int. Cl.[5] A61B *6/08*

U.S. Cl. 378—205 **7 Claims**



1. An angle detecting device for detecting the angular position of a crystalline semiconductor wafer, comprising:

X-ray irradiation means for generating an X-ray beam directed onto a wafer for diffraction thereby;

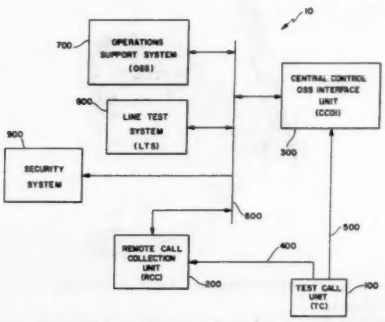
two-dimensional array sensor means for detecting a Laue diffraction pattern formed by diffraction of the X-ray beam by the wafer; and

angle determination means, coupled to the output of said sensor means, for determining the angular position of the wafer in response to the Laue diffraction pattern detected by said sensor means.

5,073,919
AUTOMATICALLY TESTING TELEPHONE LINES

Thomas E. Hagensick, Deerfield, Ill., assignor to Teradyne, Inc., Boston, Mass.

Filed Oct. 10, 1990, Ser. No. 595,246
Int. Cl.[5] H04M *1/24*; H04B *3/46*
U.S. Cl. 379—29 **47 Claims**



1. A method of testing a telephone line comprising

installing a test call unit at an end of said telephone line at which a customer's equipment is connected,

automatically initiating a telephone line test at said test call unit,

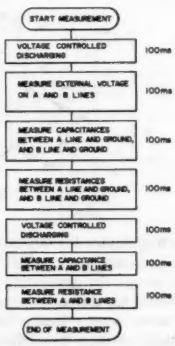
performing said telephone line test, said performing including measuring telephone line characteristics by detectors in said test call unit, and

transmitting results of tests by said detectors over said telephone line to a call collection unit.

5,073,920
METHOD AND APPARATUS OF MEASURING A SUBSCRIBER LINE

Hirohumi Masukawa, Yokohama, and Makoto Hisamura, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 17, 1990, Ser. No. 570,113
Claims priority, application Japan, Nov. 22, 1989, 1-302104
Int. Cl.[5] H04B *3/46*; H04M *1/24*
U.S. Cl. 379—30 **11 Claims**


START MEASUREMENT
VOLTAGE CONTROLLED DISCHARGING
100ms
MEASURE EXTERNAL VOLTAGE ON A AND B LINES
100ms
MEASURE CAPACITANCES BETWEEN A LINE AND GROUND, AND B LINE AND GROUND
100ms
MEASURE RESISTANCES BETWEEN A LINE AND GROUND, AND B LINE AND GROUND
100ms
VOLTAGE CONTROLLED DISCHARGING
100ms
MEASURE CAPACITANCE BETWEEN A AND B LINES
100ms
MEASURE RESISTANCE BETWEEN A AND B LINES
100ms
END OF MEASUREMENT

1. A subscriber line measuring method of measuring an insulation resistance and a capacitance between a telephone subscriber line and ground constituting an impedance between the telephone subscriber line and ground from a telephone office, comprising:

a step of applying a voltage varying continuously with respect to ground to the telephone subscriber line;

an integrated value calculating step of calculating an integrated value and a potential difference of a line current to be measured within a period of applying the varying voltage;

a step of calculating the capacitance between the telephone subscriber line and the ground on the basis of the integrated value calculated in said first integrated value calculating step;

a step of applying a voltage fixed with respect to the ground to the telephone subscriber line;

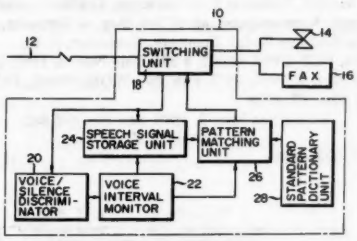
an average value calculating step of calculating an average value of the line current to be measured within a period of applying the fixed voltage; and

a step of calculating an insulation resistance between the telephone subscriber line and the ground on the basis of the average value calculated in the second average value calculating step.

5,073,921
LINE CONNECTION SWITCHING APPARATUS FOR CONNECTING COMMUNICATION LINE IN ACCORDANCE WITH MATCHING RESULT OF SPEECH PATTERN

Norimasa Nomura, Yokohama, and Masahiro Nishihata, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 252,979, Oct. 4, 1988, abandoned. This application Feb. 1, 1990, Ser. No. 472,433
Claims priority, application Japan, Nov. 30, 1987, 62-302644
Int. Cl.[5] H04M *11/00, 1/64*
U.S. Cl. 379—100 **4 Claims**



1. A switching apparatus for switching a line which is connected to a telephone, to a facsimile device, in response to a speech command coming from the line, said apparatus comprising:

means for discriminating between a speech signal and noise coming from the line, based on a predetermined threshold value;

first storing means for storing the speech signal discriminated by the discriminating means;

means for detecting the speech signal as a candidate of the speech command when a duration of the signal discriminated by the discriminating means falls within a predetermined range;

second storing means for storing a standard characteristic pattern of the speech command;

means for comparing a characteristic pattern of the speech signal detected as a candidate of the speech command with the standard characteristic pattern of the speech command; and

means for switching the line which is connected to the telephone, to the facsimile device when the characteristic pattern of the speech signal detected as a candidate of the

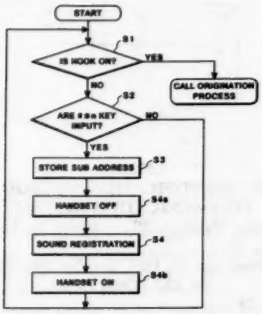
speech command matches a standard characteristic pattern of the speech command in the means for comparing.

5,073,922

COMMUNICATION TERMINAL APPARATUS

Naoyuki Okada, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 283,857, Dec. 13, 1988, abandoned. This application Jun. 20, 1990, Ser. No. 540,797
Claims priority, application Japan, Dec. 16, 1987, 62-316003
Int. Cl.[5] H04M *3/42, 1/72*
U.S. Cl. 379—164 **12 Claims**



1. A communication terminal apparatus employed in a network system operated with a subscriber number affixed with a sub address so as to allow a plurality of communication terminal apparatuses to be discriminated from each other, comprising:

a sub address discriminating means for discriminating a plurality of sub addresses from each other;

an incoming call indication tone registration means for registering a proper incoming call indication tone through a handset in correspondence with a sub address; and

an incoming call indication tone outputting means for outputting an incoming call indication tone which has been registered in said incoming call indication tone registration means in accordance with said sub address when a terminating call is received.

5,073,923

PRIVATE TELEPHONE SYSTEM WITH UNIFIED COMMAND FEATURE

Albert G. Offers, Calgary; Christopher D. White, and Roderick B. Story, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

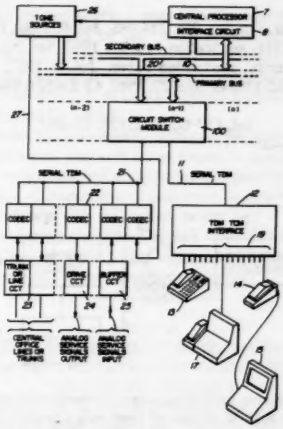
Continuation of Ser. No. 507,828, Apr. 12, 1990, abandoned. This application Dec. 20, 1990, Ser. No. 630,580
Int. Cl.[5] H04M *3/42*
U.S. Cl. 379—165 **12 Claims**

1. A method of signalling and supervision communication in a key telephone system having a central processor, a first plurality of ports, each of which is available for connection of a telephone line of a telephone switching facility, another plurality of ports, each of which is available for connection of an apparatus thereto, each port connected apparatus including an interface device for exchanging signals with the port in an operating signal format of the port, and means associated with the first plurality of ports for translating between a signalling and supervision format of the telephone line and the operating signal format of the other ports, the method comprising the steps of:

recognizing a message, from a port connected apparatus, of a context wherein access to a telephony feature is specified;

determining the specified feature to require participation of the telephone switching system;

emulating a feature access protocol of the telephone switching system in response to the context of the message; and



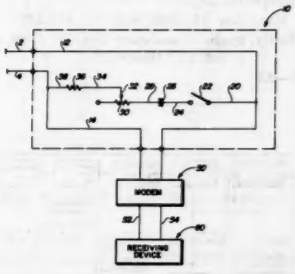
signalling the emulated feature access protocol via the telephone line, whereby a user of said port connected apparatus may be availed of a feature of the telephone switching system.

5,073,924

TELEPHONE LINE NOISE FILTER APPARATUS

Kenneth G. Frisby, 4713 E. Shangri-La, Phoenix, Ariz. 85621

Filed May 1, 1990, Ser. No. 517,025
Int. Cl.[5] H04M *1/00*
U.S. Cl. 379—394 **3 Claims**



1. Filter apparatus for filtering noise from a telephone line connected to a modem and a receiving device, comprising, in combination:

a first telephone line connected to the modem;

a second telephone line connected to the modem; and

filter means extending between the first and second telephone lines, including

a fixed resistor connected to the first telephone line,

a variable resistor connected in series with the fixed resistor,

a non-polarized capacitor connected to the second telephone line and in series with the variable resistor, and

a switch for selectively connecting and disconnecting the filter means from the second telephone line.

5,073,925
METHOD AND APPARATUS FOR THE PROTECTION OF SIGNAL COPY

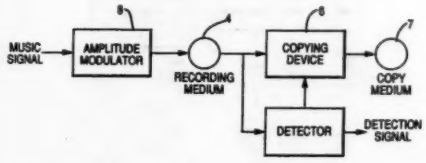
Atsushi Nagata, Hirakata; Yutaka Uekawa, Ashiya; Takanori Senoo, Hirakata, and Kenichi Takahashi, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 216,495, Jul. 8, 1988, Pat. No. 4,979,210. This application Jun. 13, 1990, Ser. No. 544,276

Claims priority, application Japan, Jul. 8, 1987, 62-170248; Jul. 8, 1987, 62-170249; Sep. 27, 1987, 62-236527; Dec. 15, 1987, 62-316635

Int. Cl.[5] G11B *23/36, 15/087*

U.S. Cl. 380—3 **11 Claims**



1. An apparatus for adding copy protection information to a signal which is to be protected from being copied, comprising:

a modulation signal generating means for generating an A.C. modulation signal which has a frequency below 10 Hz and greater than 0 Hz; and

an amplitude modulation means for amplitude-modulating the signal which is to be protected from being copied with said modulation signal to obtain an amplitude-modulated signal as a copy-protection-information-added signal, said modulation signal having an amplitude such that the amplitude-modulated signal has a modulation factor greater than 0% and below 2%.

5,073,926
PICTURE COMMUNICATION APPARATUS

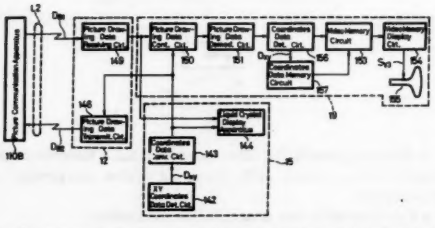
Toshio Suzuki; Hiroshi Sahara; Masashi Tonomura; Yoshihiro Murata; Naoki Fujisaki, all of Kanagawa; Seiji Hattori, and Hiroshige Kimura, both of Tokyo, all of Japan, assignors to ASCH Corporation, Japan

Filed Jan. 12, 1990, Ser. No. 464,439

Claims priority, application Japan, Jan. 20, 1989, 1-12388

Int. Cl.[5] H04N *1/42*

U.S. Cl. 379—53 **6 Claims**



1. In a two-way communication system including first and second communication terminals, telephone means at each terminal for two-way telephone service and picture communication means at each terminal for providing users with visual images of each other, each said picture communication means comprising:

camera means for generating video signals to be transmitted;

display means for displaying the visual images;

control means for controlling transmission and reception of said video signals; and

line drawing input means for generating a line drawing signal representing a line drawing and which includes tablet means adapted to have said line drawing drawn thereon by the respective user, coordinates data detecting means for detecting absolute coordinates data in parallel form, coordinates converting means for converting said absolute coordinates data detected by said coordinates data detecting means to relative coordinates data, and parallel-to-serial converting means for outputting the relative coordinates data in serial form to said control means so as to be suitable for transmission with said video signals from said control means.

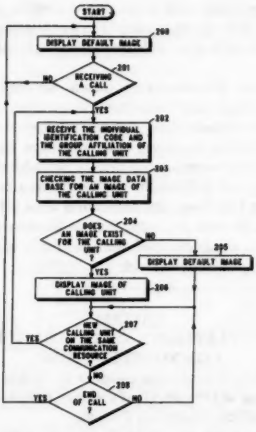
5,073,927
IMAGING IDENTIFICATION METHOD FOR A COMMUNICATION SYSTEM

Gary W. Grube, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 29, 1989, Ser. No. 399,796

Int. Cl.[5] H04M *11/00*

U.S. Cl. 379—53 **9 Claims**



4. In a trunked communication system having a limited number of communication resources and at least one communication resource controller for allocating the limited number of communication resources among a plurality of communication units, a method for each of at least one of the plurality of communication units that is receiving a call to temporarily display an image of a transmitting communication unit, the method comprises the steps of:

a) receiving an identification code of the transmitting communication unit;

b) searching an image data base for a stored image of the transmitting communication unit;

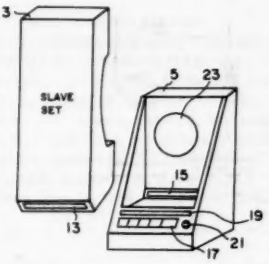
c) displaying the stored image of the transmitting communication unit when the stored image of the transmitting communication unit is found in the image data base; and

d) displaying a stored default image when the stored image of the transmitting communication unit is not found in the image data base.

5,073,928
CORDLESS TELEPHONE SYSTEM HAVING AN AUTOMATIC ANSWERING DEVICE

Masanobu Shimanuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 13, 1990, Ser. No. 508,608
Claims priority, application Japan, Apr. 18, 1989, 1-98464
Int. Cl.[5] H04M *1/64, 11/00*
U.S. Cl. 379—70 **6 Claims**

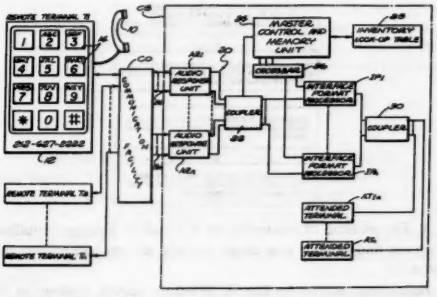


1. A cordless telephone system comprising:
a master set connected to a telephone line;
a mobile slave set including a battery as a power supply, for carrying out a radio communication of speech signals and control signals with said master set to thereby conduct a communication with said telephone line;
a mobile charger adapted to be connected to said slave set when said slave set is attached to charge said battery;
coupling means for coupling said slave set and said charger so that communication of said speech signal and said control signal can be conducted therebetween;
automatic answering means provided in said charger to respond to a control signal indicative of a cell incoming from said slave set to carry out a communication with said slave set through said coupling means to thereby execute an automatic answering service determined in advance.

5,073,929
VOICE-DATA TELEPHONIC CONTROL SYSTEM

Ronald A. Katz, Los Angeles, Calif., assignor to First Data Resources Inc., Omaha, Nebr.

Continuation-in-part of Ser. No. 194,258, May 16, 1988, Pat. No. 4,845,739, which is a continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned. This application Feb. 21, 1989, Ser. No. 312,792
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.
Int. Cl.[5] H04M *1/64, 11/00*
U.S. Cl. 379—93 **19 Claims**

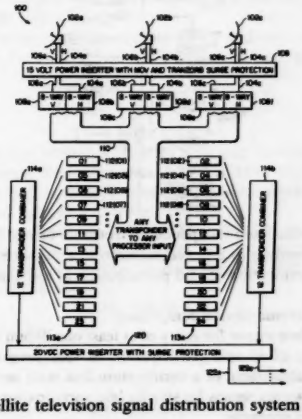


1. A voice-data control system for use with a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means for providing audio response signals and digital input means for providing digital response signals, said control system comprising:
cue means for cueing select ones of said terminals to prompt selective actuation of said voice communication means and said digital input means to provide responsive signals;
status means to selectively identify responsive signals from each select terminal as digital control signals, digital data signals or audio signals;
control means implementing a stored program to control said cue means and said status means in accordance with said program and said digital control signals to prompt the provision of responsive signals from each select terminal in accordance with said status means; and
means for storing responsive signals from said select terminals including digital data signals and audio signals as selectively identified by said status means.

5,073,930
METHOD AND SYSTEM FOR RECEIVING AND DISTRIBUTING SATELLITE TRANSMITTED TELEVISION SIGNALS

James A. Green, Rte. 4, Box 402, Tallahassee, Fla. 32304, and Brian F. Hearn, 1555 Delaney Dr., Apt. 414, Tallahassee, Fla. 32308

Filed Oct. 19, 1989, Ser. No. 423,146
Int. Cl.[5] H04N *7/167;* **H04H** *1/04*
U.S. Cl. 380—10 **34 Claims**


15 VOLT POWER INSERTER WITH MOV AND TRANSIENT SURGE PROTECTION
ANY TRANSPONDER TO ANY PROCESSOR INPUT
20VDC POWER INSERTER WITH SURGE PROTECTION

1. A satellite television signal distribution system comprising:
at least one satellite antenna receiving a block of signals transmitted by satellite, said block being disposed within a first frequency range;
selective signal frequency altering means coupled to said antenna for altering the frequency of selected signals within said received block without demodulating said selected signals so as to provide a further block of signals having an altered signal frequency distribution as compared to said received block of signals, said further block of signals being substantially disposed within said same first frequency range;
a distribution network coupled to said selective signal frequency altering means, said distribution network distributing said further block of signals to plural subscriber locations; and
plural satellite receiver means, located at corresponding said plural subscriber locations, for selecting signals within

said distributed further signal block and for deriving, from said selected signals, a further signal capable of being processed by standard television receiver equipment.

5,073,931

SYSTEM AND INDIVIDUAL DEVICE FOR PARTICIPATION IN A BROADCAST PROGRAM

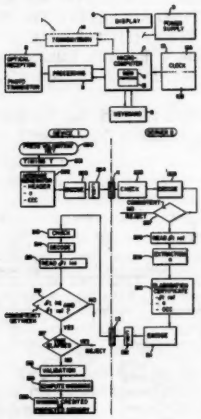
Yves Audebert, Croissy-sur-Seine, and Achille Delahaye, Fontenay-sous-Bois, both of France, assignors to Audebert-Delahaye-Venture, Issy-les-Moulineaux, France

Filed May 18, 1990, Ser. No. 524,890

Claims priority, application France, May 25, 1989, 89 06848; Feb. 9, 1990, 90 01512

Int. Cl.[5] H04K *1/00*

U.S. Cl. 380—23 **28 Claims**



1. Individual and independent electronic device for participation according to a stored scenario in a broadcast program and for certification of said participation in association with a server,

the electronic device comprising:

interface means for entry of at least one datum representative of a) said participation in said program and b) establishment of a certification link with said server;

first storing means for storing said participation datum and said scenario;

a clock; and

first measuring means for measuring a first relative time elapsed between a) at least a first event of said scenario, chronologically correlated with entry of said participation and b) the establishment of said certification link with the server;

the server including at least a second measuring means for measuring a second relative time elapsed between a) at least a second event of said program, chronologically correlated with an absolute deadline for entry of said participation and b) the establishment of said certification link; and

one of the electronic device and the server including comparing means for comparing the first and second relative times measured in the electronic device and the server and for conditionally certifying said participation as a function of an outcome of said comparison.

5,073,932

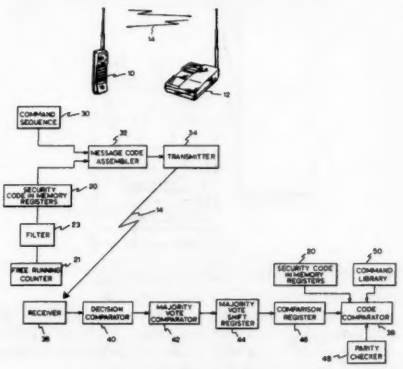
SECURED DATA TRANSMISSION AND ERROR RECOVERY MECHANISM IN CORDLESS TELEPHONES

Oded Yossifor, 22422 Anza Ave., Torrance, Calif. 90505, and Sanford M. Brown, III., 301 Via Mesa Grande, Redondo Beach, Calif. 90277

Filed Aug. 31, 1990, Ser. No. 575,587

Int. Cl.[5] H04K *1/00*; H04M *11/00*; G06F *11/08*

U.S. Cl. 380—23 **27 Claims**



1. A method for securing transmission of data between transmitting and receiving units of handset and base portions of a cordless phone while maintaining integrity of the transmitted data comprising:

transmission of a security code to ensure that random or unauthorized data is not accepted by the receiving unit;

transmission of a message bit sequence to ensure that data is not misinterpreted;

transmission of a command sequence comprising data sent by the transmitting unit; and

transmission of an error detection code to ensure that errors arising within said message bit sequence and said command sequence are detected.

5,073,933

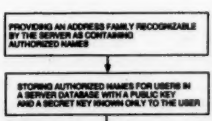
X WINDOW SECURITY SYSTEM

David S. H. Rosenthal, Palo Alto, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Dec. 1, 1989, Ser. No. 444,663

Int. Cl.[5] H04L *9/30*; G06F *13/14*

U.S. Cl. 380—25 **10 Claims**


PROVIDING AN ADDRESS FAMILY RECOGNIZABLE BY THE SERVER AS CONTAINING AUTHORIZED NAMES
STORING AUTHORIZED NAMES FOR USERS IN A SERVER DATABASE WITH A PUBLIC KEY AND A SECRET KEY KNOWN ONLY TO THE USER
GENERATING A CREDENTIAL ENCRYPTED BY THE HOST COMPUTER TERMINAL PUBLIC KEY INCLUDING THE CLIENT NAME AND A VERIFIER
DECRYPTING THE CREDENTIAL AT THE SERVER USER THE SERVER SECRET KEY TO OBTAIN THE VERIFIER
COMPARING THE NAME OF THE CLIENT WITH THE ADDRESS FAMILY RECOGNIZABLE BY THE SERVER AS AUTHORIZED USERS

1. The method of rendering an X Window System including a server and at least one client process secure comprising the steps of:

restricting access to the X Window server system to an authorized user at a host computer terminal using an

address family, the address family being encrypted and decrypted using a standard public key cryptographic algorithm.

allowing said user to view only resources of the X Window server system specifically authorized to that user and resources authorized to an authenticator zero, and

allowing said user to manipulate resources of the X Window server system specifically authorized to that user and resources authorized to an authenticator zero.

5,073,934

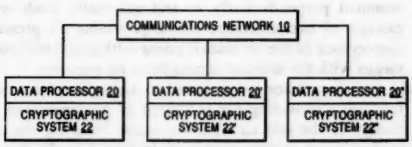
METHOD AND APPARATUS FOR CONTROLLING THE USE OF A PUBLIC KEY, BASED ON THE LEVEL OF IMPORT INTEGRITY FOR THE KEY

Stephen M. Matyas; Donald B. Johnson; An V. Le, all of Manassas, Va.; William C. Martin, Concord, N.C.; Rostislaw Prymak, Dumfries, Va.; William S. Rohland, Charlotte, N.C., and John D. Wilkins, Somerville, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1990, Ser. No. 602,989

Int. Cl.[5] H04L *9/30*

U.S. Cl. 380—30 **30 Claims**



11. In a public key cryptographic system including a pair of cryptographic devices communicating using a public key algorithm, an apparatus for limiting the use of a public key to applications not requiring a level of integrity greater than a received level of integrity for the public key, comprising:

first means for generating a public key and private key as a pair;

second means coupled to said first means, for storing said public key at a first device in said system;

third means coupled to said second means, for storing at said first device a control vector associated with said public key, having a first field;

fourth means coupled to said second and third means, for transmitting from said first device, over a communications link to a second cryptographic device, said public key and said control vector, using a selected one of a plurality of levels of integrity for the transmission;

fifth means coupled to said communications link, for testing at said second device said public key and said control vector to determine a received level of integrity thereof;

sixth means coupled to said fifth means, for writing at said second device a value into said first field of said control vector characterizing said received level of integrity; and

seventh means coupled to said sixth means, for limiting cryptographic applications for said public key, to said received level of integrity characterized by said first field in said control vector.

5,073,935

METHOD FOR SECURE COMMUNICATION

Jose Pastor, 191 Wilton Rd., Westport, Conn. 06880

Filed Dec. 17, 1990, Ser. No. 628,247

Int. Cl.[5] H04L *9/30, 9/06, 9/08*

U.S. Cl. 380—30 **12 Claims**

10. A system for transmitting secure communications, comprising:

a) first means for storing a key E_s, said key E_s being on of an encryption/decryption key pair E_s,D_s, said key pair comprising keys E_s and D_s of a first order selected to provide a predetermined level of security;

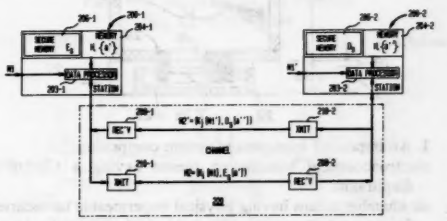
b) second means for storing:

b1) a set of numbers (a'), said numbers a' having the property that when encrypted with said key E_s values E_s[a'] of s second order substantially less than said first order are obtained; and

b2) a hashing function H for mapping said numbers a' onto numbers of a third smaller order;

c) data processing means responsive to said first and second storing means for:

c1) selecting a number a' from said set (a');



c2) encrypting said selected number a' with said key E_s to obtain a particular value E_s[a'];

c3) operating on said selected number a' with said hashing function H to obtain a single key encryption key K_j, K_j being equal to H(a');

c4) encrypting a message M1 with said key K_j;

c5) forming a second level message M2 including said encrypted first level message K_j[M1] and said particular value E_s[a']; and,

d) transmission means responsive to said data processing means for sending said second level message M2.

5,073,936

STEREOPHONIC MICROPHONE SYSTEM

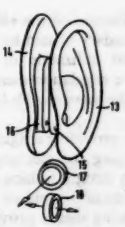
Rudolf Görike, Sternwartestrasse 57c, A-1180 Vienna; Fritz Sippl, Vienna, and Sandor Szabo, Klosterneuburg-Kierling, all of Austria, assignors to Rudolf Görike

Continuation of Ser. No. 283,180, Dec. 12, 1988, abandoned. This application Dec. 5, 1989, Ser. No. 449,298

Claims priority, application Austria, Dec. 10, 1987, 3249/87; Feb. 29, 1988, 521/88

Int. Cl.[5] H04R *5/027*

U.S. Cl. 381—26 **9 Claims**



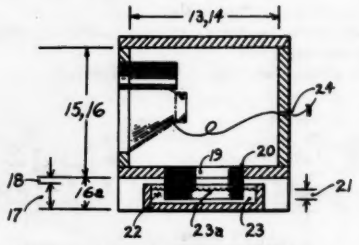
1. A stereophonic microphone system comprising, stereophonic sound pickups, two replicas of human pinnas, a replica of an outer auditory meatus being connected to each pinna replica, a pressure microphone being mounted in each pinna replica so as to close off each auditory meatus, each pressure microphone having an ear resonance which is effective by electrical admixing with outputs of said stereo pickups, the microphones with pinna replicas being arranged spaced apart and oriented as on the human head.

5,073,937

HYDRODYNAMICALLY PRESSURE REGULATED LOUDSPEAKER SYSTEMS

Lee W. Almasy, 339 Long Rd., Pittsburgh, Pa. 15235

Filed Apr. 11, 1990, Ser. No. 507,638
Int. Cl.[5] H04R 25/00; H05K 5/00
U.S. Cl. 381—188 6 Claims



1. An improved loudspeaker system comprising:

electroacoustical transducing means having a vibratible diaphragm,

air chamber means having physical impermeable boundaries forming a hollow air cavity, said air cavity confining an air mass,

open-ended manometer type device means providing a waterproof conduit with said conduit to be partially filled with liquid, said conduit to perform the structure functionality of an U-tubed shaped conduit with the outlet end of said conduit to be vented to atmospheric pressure and the inlet end of the said conduit in pressure communication with air mass of the said air chamber means,

pressure regulator means controlling the air pressure of a volumetrically confined air mass using open ended manometer-type device structure means to act as a pressure conveyance of the air pressure of the said volumetrically confined air mass with the ambient air pressure, said open-ended manometer type device means to be partially filled with said liquid mass, said liquid mass serving to confine said air mass of said air chamber means, said liquid possessing a density of 2 gm/cc (+/−1.5 gm/cc),

said pressure regulation means having open-ended manometer-type device means providing for sufficient vertical movement of said liquid such as to accommodate at least twice the volumetric displacement associated with the maximum linear excursion of the electroacoustical transducing means vibratile diaphragm's maximum excursion distance,

said pressure regulation means exhausting the outlet of the open-ended manometer type device means to atmospheric pressure,

enclosure means utilization of the vibratile diaphragm as a portion of the boundary of said air chamber means,

said enclosure means utilization of the liquid contained within the pressure regulation means, said liquid serving to be a portion of the impermeable boundary of the said air chamber means,

said enclosure means providing a rigid rectangular air chamber means supporting the electroacoustical transducing means sealed in an airtight fashion upon the periphery of an aperture on a side of the said air chamber, said electroacoustical transducing means providing for the transformation of incoming electrical energy into air pressure waves,

said enclosure means mounting the inlet of pressure regulation means in an airtight fashion about the periphery of an aperture located on a side of said enclosure means,

said enclosure means providing a coacting of the air mass residing within the said air chamber means with the said electroacoustical transducing means providing changes in the average pressure level of the said air mass, said pressure regulation means coacting with the air mass of air chamber means, said pressure regulation means reducing changes in average air pressure within the said air chamber means,

wherein the effect of the pressure regulation means is a reduction in the change of air pressure within the air chamber thereby allowing the loudspeaker to emulate the air pressure behavior.

said pressure regulation means providing enhanced volume means providing reduction of torsional energy acoustically imparted to structure of enclosure means by the air mass of the said air chamber means, said reduction of said torsional energy reducing the amplitude of the standing waves produced by the structure of the said enclosure means,

said pressure regulation means providing for a reduction in compressional air energy of the air mass residing within the said air energy of the air mass residing within the said air chamber means, reduction of said energy to promote a lowering of the lower limit of the loudspeaker's low frequency operational frequency band, reduction of said energy to reduce loudspeaker diaphragm excess excursion, reduction of said energy to promote an increase in the performance efficiency of the electroacoustical transducing means,

passive radiator means possessing an acoustical mass, said acoustical mass to residing within a conduit, said conduit mounted perpendicularly to and externally flush with exterior of said enclosure means providing air pressure conveyance of the air mass residing within said enclosure means with the ambient atmospheric air pressure,

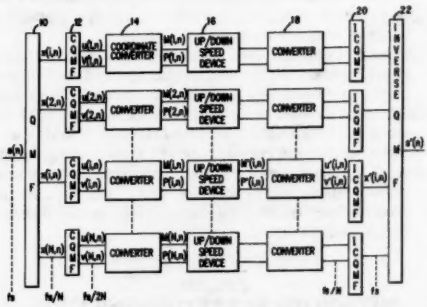
said passive radiator means tuned to a specified resonance frequency providing for reduction of compressional air energy of the said air chamber means reducing the said energy, said energy causal of loudspeaker diaphragm excess excursion, said excess excursion being reduced by passive radiation means.

5,073,938

PROCESS FOR VARYING SPEECH SPEED AND DEVICE FOR IMPLEMENTING SAID PROCESS

Claude Galand, Cagnes sur Mer, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 168,836, Mar. 16, 1988, abandoned.
This application Oct. 17, 1989, Ser. No. 423,732
Claims priority, application Hague, Apr. 22, 1987, 87430010
Int. Cl.[5] G10L 7/02
U.S. Cl. 381—34 8 Claims



1. An apparatus for digitally varying the speed of a speech signal having a speech frequency bandwidth without measuring or substantially varying the pitch of the speech signal, including:

means for splitting at least a portion of the speech frequency bandwidth of said speech signal into a plurality of consecutive narrow sub-band signals;

means for processing each of said sub-band signals to derive

therefrom phase samples and magnitude samples representative of the sub-band signal contents expressed in polar coordinates;

means for speed varying said sub-band signals by repeating phase and magnitude samples or deleting samples therefrom at a rate depending upon the desired slowing-down or speeding-up rate respectively;

means for recombining each sub-band phase and magnitude samples into a speed varied sub-band signal; and

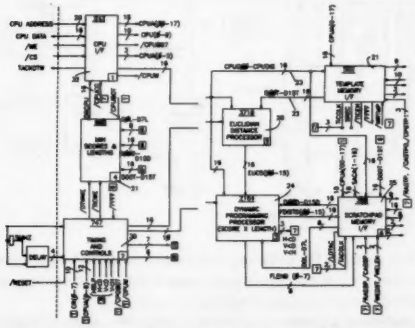
means for recombining said speed varied sub-band signals into recombined speech, whereby said recombined speech is a speed varied version of said speech signal having substantially the same pitch as said speech signal.

5,073,939

DYNAMIC TIME WARPING (DTW) APPARATUS FOR USE IN SPEECH RECOGNITION SYSTEMS

George Vensko, Ramona; Khuong B. Lieu, Steven A. Meloche, and John C. Potter, all of San Diego, all of Calif., assignors to ITT Corporation, New York, N.Y.

Filed Jun. 8, 1989, Ser. No. 363,227
Int. Cl.[5] G10L 7/08
U.S. Cl. 381—43 18 Claims



1. A speech recognition system for recognizing unknown uttered speech, or recognizing individual key words, or verifying the identity of a speaker from unknown speech, by comparing the unknown speech with stored templates representing known reference speech words or phrases and providing a best match to determine a word or phrase uttered or the identity of the speaker, the system including an analog to digital converter for converting the unknown speech into digital formats and a digital signal processor for converting said digital formats into template frames of the unknown speech each represented by a plurality of coefficients, wherein said template frames of the unknown speech are processed by dynamic time warping to derive from said coefficients Euclidean distances which are processed by template comparison to provide a best match between the unknown speech and a stored reference template indicative of a spoken word, in combination therewith,

said digital signal processor having means for providing template frames having coefficients of any selected one of at least two different groups, with a first group of a given number of coefficients and a second group of at least twice the number of coefficients,

dynamic time warping (DTW) means operative to process unknown speech template frames of either the first or second group of coefficients as selected, including:

Euclidean distance processor means for computing a given bit Euclidean distance between the unknown speech template frames and the reference template frames independent of the number of coefficients in said selected group and

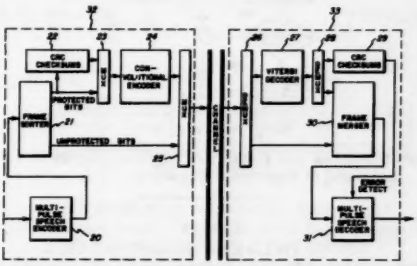
dynamic programming processor means responsive to outputs from said Euclidean distance processor means for providing a dynamic time warping distance measurement as compared to said reference template to determine a best match to the unknown speech independent of the number of coefficients processed.

5,073,940

METHOD FOR PROTECTING MULTI-PULSE CODERS FROM FADING AND RANDOM PATTERN BIT ERRORS

Richard L. Zinser, Schenectady; Steven R. Koch, Waterford, and Raymond L. Toy, Latham, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 24, 1989, Ser. No. 441,022
Int. Cl.[5] G10L 5/00
U.S. Cl. 381—47 11 Claims



1. A method for protecting multi-pulse linear predictive speech coders from fading and random pattern bit errors comprising the steps of:

selecting perceptually significant bits of multi-pulse coded speech parameters to be protected, the parameters being a set of line spectrum pair frequency coefficient bits, pitch lag bits, voiced/unvoiced bits, pitch tap gain bits, pulse amplitude bits, and pulse position bits;

generating checksums of said selected bits;

combining said checksums and said selected bits;

coding the selected bits and said checksums according to a convolutional code to protect transmitted data from random errors;

combining the convolutionally coded selected bits, checksums, and nonselected bits of the multi-pulse encoded speech; and

transmitting the combined convolutionally coded selected bits, checksums, and nonselected bits.

5,073,941

MULTIFREQUENCY DETECTION

Michael E. Locke, Santa Clara, Calif., assignor to IBM Corporation, Armonk, N.Y.

Filed Feb. 1, 1988, Ser. No. 150,798
The portion of the term of this patent subsequent to Jan. 17, 2007, has been disclaimed.
Int. Cl.[5] G10L 5/00
U.S. Cl. 381—47 25 Claims

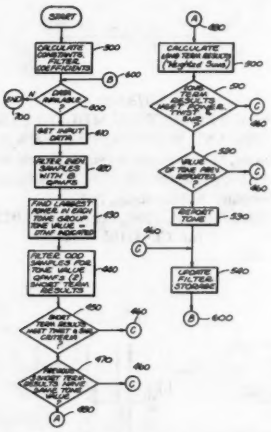
1. A method of detecting frequencies in a plurality of stored samples in a memory, comprising:

(a) selectively processing a first subset of said plurality of stored samples to detect a signal of a particular frequency;

(b) selectively filtering a second subset of said plurality of stored samples;

(c) adding said first subset of said plurality of stored samples to said second subset of said plurality of stored samples

and storing a plurality of resultant samples in said memory; and



(d) processing said plurality of resultant samples to verify said signal of a particular frequency.

5,073,942

SOUND FIELD CONTROL APPARATUS

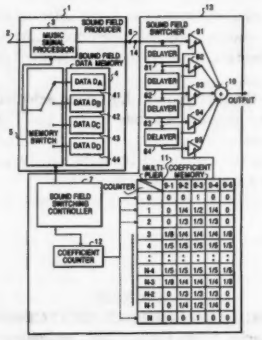
Hiroko Yoshida; Mitsuhiko Serikawa; Akihisa Kawamura, all of Hirakata; Masaharu Matsumoto, Katano, and Katsuaki Sato, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 24, 1991, Ser. No. 645,476

Claims priority, application Japan, Jan. 26, 1990, 2-17343

Int. Cl.[5] H03G *3/00*

U.S. Cl. 381—61 **5 Claims**



1. A sound field control apparatus comprising:

a sound field producer for processing a music signal to selectively produce one of plural sound field signals;

plural delayers for sequentially delaying an output sound field signal of the sound field producer;

plural multipliers for multiplying the output sound field signal of the sound field producer and output signals of the plural delayers by specified coefficients, respectively;

an adder for adding output signals of the plural multipliers;

a coefficient changer for changing the coefficients of the plural multipliers; and

a controller for controlling the sound field producer and the coefficient changer,

wherein, when switching a sound field, the controller controls the sound field producer to switch the output sound field signal of the sound field producer from a first sound field signal to a second sound field signal, and also controls the coefficient changer to change the coefficients of the plural multipliers so that an output signal of the adder is smoothly changed from the first sound field signal to the second sound field signal through a process in which the output signal of the adder gradually decreases the first sound field signal and gradually increases the second sound field signal.

5,073,943

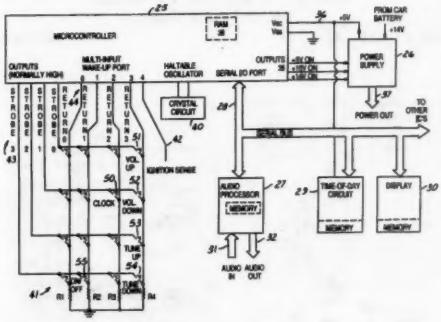
AUTOMOTIVE AUDIO SYSTEM HAVING ACTIVE CONTROLS IN REDUCED POWER STATE

Max C. Chapman, Plymouth, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 290,726

Int. Cl.[5] H04B *1/00*

U.S. Cl. 381—86 **16 Claims**



1. A method for initiating a system activity in a temporarily powered-down microprocessor-controlled audio system, said method comprising the steps of:

instituting an interruptible reduced-power state of said microprocessor with system parameters stored in a keep-alive memory;

generating an interrupt signal in response to a non-main power-up control activity on at least one input device of said audio system while said microprocessor is in said reduced-power state and providing said interrupt signal to said microprocessor;

resuming program execution in said microprocessor upon receipt of said interrupt signal without restoring full audio operation of said audio system;

determining the source of said interrupt signal; and

executing a service routing corresponding to said source of said interrupt signal.

5,073,944

AUDIO SYSTEM FOR AUTOMOTIVE VEHICLES

Yoshiaki Hirasa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 26, 1989, Ser. No. 385,869

Claims priority, application Japan, Jul. 26, 1988, 63-186351

Int. Cl.[5] H04B *1/00*

U.S. Cl. 381—86 **10 Claims**

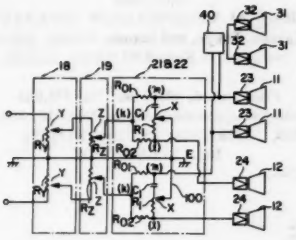
1. An audio system for an automotive vehicle with a plurality of speakers disposed inside a passenger compartment room of aid automotive vehicle, comprising:

at least one front speaker disposed at a front end of said passenger compartment room and at least one rear speaker disposed at a rear end of said passenger compartment room;

front fader means connected to said at least one front speaker

for transmitting mainly low frequency sound signals and for fading high frequency sound signals;

rear fader means connected to said at lest one rear speaker for fading both high and low frequency sound signals; and



control means for actuating said front fader means and said rear fader means so as to control a balance between said at least one front speaker and said at least one rear speaker;

wherein said front fader means does into fade low frequency sounds even when the high frequency sounds are faded to zero.

5,073,945

LOUDSPEAKER SYSTEM

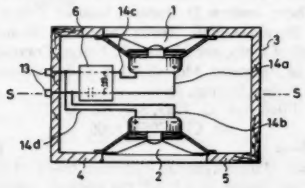
Satoshi Kageyama, Takatsuki, and Suemei Fukuhara, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 23, 1990, Ser. No. 556,073

Claims priority, application Japan, Jul. 24, 1989, 1-190989; Jul. 24, 1989, 1-190990; Jul. 24, 1989, 1-190993; Aug. 4, 1989, 1-203253

Int. Cl.[5] H04R *1/24, 1/28*

U.S. Cl. 381—89 10 Claims



1. A loudspeaker system comprising:

a loudspeaker console having a front baffle board and a back baffle board which are disposed in substantial parallelism to each other,

a pair of loudspeakers which are mounted on respective baffle boards and operate with substantially the same characteristic with each other above a predetermined cut-off frequency but radiate sound of different level under said predetermined cut-off frequency, and

a driving circuit for driving said two loudspeakers in each-other opposite phase relation.

5,073,946

THIN SPEAKER HAVING AN ENCLOSURE WITH AN OPEN PORTION AND A CLOSED PORTION

Katsuaki Satoh, Osaka; Kazue Sato, Neyagawa; Kousaku Murata, Kobe; Tsuneo Tanaka, Nishinomiya; Shuji Saiki; Satoshi Takayama, both of Hirakata; Hiroyuki Takewa, Kaizuka; Mitsuhiko Serikawa; Seiichi Ishikawa, both of Hirakata; Sawako Usuki, Kobe; Yoichi Kimura, Ashiya, and Shuichi Obata, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

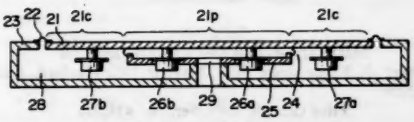
Continuation-in-part of Ser. No. 96,528, Sep. 15, 1987, Pat. No. 4,899,390. This application Nov. 28, 1989, Ser. No. 441,918

Claims priority, application Japan, Sep. 19, 1986, 61-223149; Oct. 20, 1986, 61-248726; Nov. 27, 1986, 61-282501; Dec. 19, 1986, 61-304326; Apr. 1, 1987, 62-80015; Apr. 20, 1987, 62-96502

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.[5] H04R *25/00, 7/00;* H05K *5/00*

U.S. Cl. 381—154 10 Claims



9. A speaker of the direct radiator-type comprising:

a thin enclosure having a front side with a front opening and a rear side with a rear opening;

a rigid diaphragm connected to the enclosure at the front opening;

means for partitioning the enclosure to provide a closed enclosure portion and an open enclosure portion which communicates with the rear opening, part of the diaphragm being exposed to the closed enclosure portion and another part of said diaphragm being exposed to the opening enclosure portion;

at least one coil unit to drive the part of the diaphragm that is exposed to the close enclosure portion; and

at least one further voice coil unit to drive the another part of the diaphragm that is exposed to the closed enclosure portion,

wherein the driving force per unit area N_C/S_C is set to be larger than the driving force per unit are N_O/S_O, where N_C represents the total driving force of the at least one voice coil unit that drives the part of the diaphragm exposed to the closed enclosure portion, S_C represents the area of the part of the diaphragm exposed to said closed enclosure portion, N_O represents the total driving force of the at least one further voice coil unit that drives the part of the diaphragm exposed to the open enclosure portion, and S_O represents the area of the part of the diaphragm exposed to the open enclosure portion.

5,073,947

HEARING DEVICE FOR A PROTECTIVE HELMET

Hans Reddemann; Tronje von dem Hagen, both of Lübeck, Fed. Rep. of Germany, and Balz Knabenhans, Ennetbürgen, Switzerland, assignors to Drägerwerk AG, Lübeck, Fed. Rep. of Germany

Filed Oct. 23, 1989, Ser. No. 425,696

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1988, 3836036

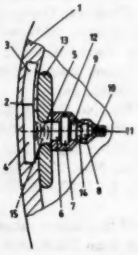
Int. Cl.[5] H04R *25/00;* A61B *7/02*

U.S. Cl. 381—187 10 Claims

1. A hearing device for a protective helmet, comprising:

a receiving device and a wireless transmitting device mounted within the helmet for receiving and transmitting auditory signals; and, an earplug arrangement including an earphone positioned in the outer auditory canal of the

wearer and a wireless earplug receiver, said transmitting device and said earplug receiver being positioned spaced apart in facing relationship defining a wireless transmission path for transmitting signals representative of auditory signals from said transmitting device to said earplug receiver.

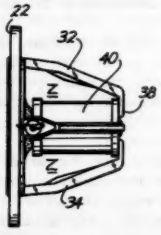


5,073,948

MIDRANGE LOUDSPEAKER DRIVER

Richard J. Vandersteen, 2017 Mayfair Dr., Hanford, Calif. 93230

Filed Oct. 10, 1989, Ser. No. 418,506
Int. Cl.[5] H04R *25/00*
U.S. Cl. 381—192 **11 Claims**



1. A loudspeaker driver for generating sound waves in the mid-range of audio frequencies from an electrical signal thereof, comprising:

a magnetic driver defining a drive motion along a predetermined axis,

a diaphragm having a diameter extending laterally across said axis to define a sound generating area, a resilient outer suspension, and a moving coil assembly for receiving said electrical signal, said diaphragm, when driven with said electrical signal, generating sound waves moving in a forward direction for listening and unwanted sound waves propagating in a rearward direction,

a rigid basket including a front flange for supporting the diaphragm at the suspension and a rear flange for supporting said magnetic driver without any portion of said basket extending across the front of said diaphragm, said basket including a plurality of arms connecting the front flange and the rear flange for rigidly holding the rear flange in spaced relation away from the front flange,

said magnetic driver being mounted to the rear flange at one end and magnetically coupled at the other end to the moving coil assembly,

said arms extending rearwardly away from the front flange and diaphragm for a substantial distance before converging toward said rear flange,

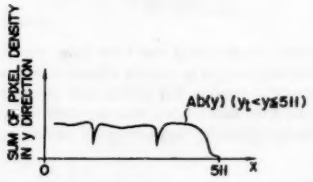
said arms and said magnetic driver thereby forming an anti-reflection zone within said basket and extending laterally over the rearwardly projected area of the diaphragm and extending rearwardly about a diaphragm diameter from said front flange and diaphragm and within the interior of said loudspeaker in front of said rear flange and arms, which zone prevents forward reflection of rearwardly propagating waves backward and into and through the speaker diaphragm from said zone.

5,073,949

PERSONAL VERIFICATION APPARATUS

Masahiro Takeda, Tokyo, and Satoshi Uchida, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 6, 1990, Ser. No. 475,863
Claims priority, application Japan, Mar. 16, 1989, 1-64323; Mar. 31, 1989, 1-83583; May 25, 1989, 1-131852
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—2 **10 Claims**



1. A personal verification apparatus for performing personal verification using a plurality of fingers, comprising:

feature data memory means for storing feature data to be collated of the fingers;

input means for inputting image data of the plurality of fingers, the image data including at least two joints of each finger;

separating means for separating the image data of the plurality of fingers input by said input means into image data for each of the plurality of fingers;

generating means for adding the density of the image data of the fingers separated by said separating means in a direction perpendicular to the longitudinal direction of the fingers to output the added data as feature of the fingers; and

collating means for individually comparing and collating the feature data obtained by said generating means with the feature data to be collated stored in said feature data memory means for each of the plurality of fingers to determine coincidence or noncoincidence.

5,073,950

FINGER PROFILE IDENTIFICATION SYSTEM

Charles Colbert; Andrew D. Jerison, both of Yellow Springs; David K. Berelman-Hall, Xenia; Donald R. Moles, Yellow Springs, all of Ohio, and Nathan D. Potter, Corvallis, Oreg., assignors to Personnel Identification & Entry Access Control, Inc., Yellow Springs, Ohio

Filed Apr. 13, 1989, Ser. No. 337,793
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—2 **18 Claims**

1. A method of identifying an individual based on the profile of one or more fingers on a hand, the method comprising the steps of creating a reference template by

a) determining the location of the edges of each finger separately,

b) establishing a central axis for each finger by reference to the edges thereof,

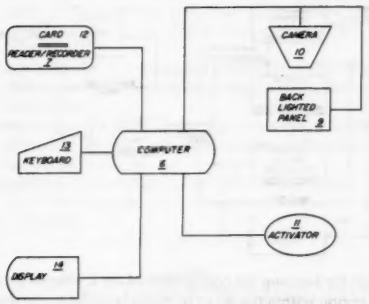
c) rotating the central axis of each finger until it is normal to a common reference line,

d) determining the finger profile by measuring the distance of each finger edge from its central axis at predetermined locations parallel to said reference line, and

e) recording said finger profile information as a template; and thereafter

determining a candidate's finger profile by following steps a) to d) above,

comparing the candidate's finger profile with the reference template,



determining whether the correspondence between the candidate's finger profile and the reference template meets certain predetermined criteria, and

indicating acceptance or rejection of the candidate.

5,073,951

METHOD OF INSPECTING AN ADHESIVE TO FASTEN A CENTER HUB TO A MAGNETIC DISK

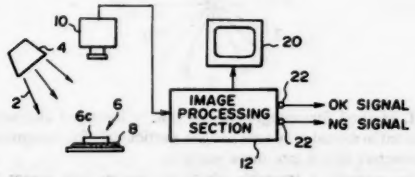
Yoichi Hayashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 16, 1990, Ser. No. 567,571

Claims priority, application Japan, Aug. 18, 1989, 1-212635

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—8 **5 Claims**



1. A method of inspecting a floppy disk comprising a magnetic disk body and a center hub which has an annular flange portion and is bonded to the center of the magnetic disk body by adhesive which is to be coated over an annular coating area on the flange portion, the method being for inspecting whether application of adhesive to the flange portion of the center hub is in a satisfactory state and comprising the steps of

projecting light onto an area including said annular coating area, an area inside the coating area and an area outside the coating area; photo-electrically detecting reflected light; processing the electrical signal thus obtained and subjecting it to connectivity analysis to detect connectivity components comprising regions of connected, like-valued signal components; and determining that application of the adhesive is in a satisfactory state when the number of connectivity components is 3, while determining that application of the adhesive is in an unsatisfactory state when the number of connectivity components is not 3.

5,073,952

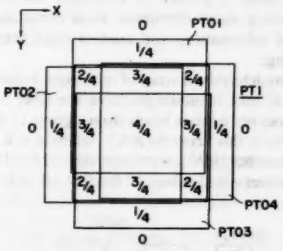
PATTERN RECOGNITION DEVICE

Masaharu Watanabe, Kanagawa, Japan, assignor to Sigmax Kabushiki Kaisha, Yokohama, Japan

Filed Sep. 7, 1988, Ser. No. 241,177

Int. Cl.[5] G06K *9/60*

U.S. Cl. 382—8 **4 Claims**



1. A defect recognition device for a video image region of a workpiece, comprising:

means for obtaining first video image data corresponding to said video image region of said workpiece;

means for obtaining second video image data of a master which corresponds to said video image region;

means for comparing said first video image data with said second video image data, including:

means for shifting an original video image represented by the second video image data in predetermined directions by a predetermined distance to produce a plurality of shifted images,

means for forming overlap image data representing an overlap image formed by overlapping said original image with said shifted images, and

means for forming difference image data by computing the difference between said overlap image data and said original image data;

means for excluding from the output of said comparing means image data portions of said first and said second video image data corresponding to border regions of said first and second video image data, said excluding means comprising means for producing image data including data corresponding to a region to be excluded and a region to be observed by comparing said difference image data with a predetermined threshold value, said excluding means excluding portions of said first and second image data corresponding to said data of said region to be excluded from an output of said producing means; and

judging means responsive to an output of said excluding means for judging whether said workpiece includes one or more defects.

5,073,953

SYSTEM AND METHOD FOR AUTOMATIC DOCUMENT SEGMENTATION

Jacob A. Westdijk, Venlo, Netherlands, assignor to OCE Nederland B.V., Netherlands

Filed Sep. 1, 1989, Ser. No. 403,195

Claims priority, application European Pat. Off., Sep. 12, 1988, 88201987

Int. Cl.[5] G06K *9/34*

U.S. Cl. 382—9 **6 Claims**

1. A method for automatically segmenting a scanned document in an electronic document processing device to separate document areas containing different types of image information comprising the steps of:

(a) scanning the document to generate a scanned image thereof;

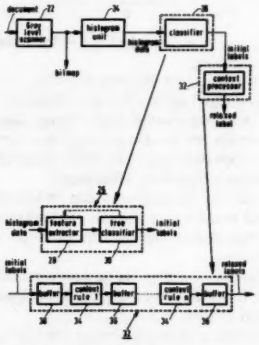
(b) subdividing the scanned image into a matrix of subimages;

(c) analyzing the information contained in each subimage

and assigning to each subimage an initial label selected from a first set of labels to obtain an initial label matrix; and

(d) relating the initial label matrix by changing the labels of individual matrix subimages into relaxed labels which are selected from a second set of labels, pursuant to a plurality of context rules, which is smaller in number than said first set to obtain a pattern of uniformly labeled segments representing those document areas containing different types of information, said context rules comprising the following:

(i) if in a predetermined array of subimages in the initial label matrix at least n subimages have the label BW and this array does not contain labels from a group G, then change all labels in this array to BW", wherein n is a predetermined number, BW is a predetermined initial label and G is a predetermined subset of the first set of labels;



(ii) "if in a predetermined array of subimages in the initial label matrix at least m subimages have the label U, then change all labels in this array to U, " wherein m is a predetermined number and U is a predetermined initial label; and

(iii) (1) "where the label U forms intersecting vertical and horizontal runs, fill the whole rectangle spanned by these runs with the label U,

(2) check all combination of horizontal and vertical runs to maximize the area to be filled with the label U, and

(3) if the height of the maximized area is smaller than h_{min} elements or the width is smaller than w_{min} elements, then change all labels within this areas to BW, " wherein U and BW are predetermined initial labels and h_{min} and w_{min} are predetermined numbers.

5,073,954

BAR CODE LOCATION AND RECOGNITION PROCESSING SYSTEM

Richard G. Van Tyne, Richardson; Marion W. Neff, Euless, and George R. Mondie, Bedford, all of Tex., assignors to Electro-Com Automation, Inc., Arlington, Tex.

Filed Feb. 28, 1989, Ser. No. 317,293

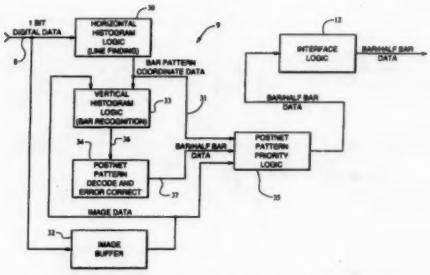
Int. Cl.[5] G06K *9/00, 7/10*

U.S. Cl. 382—18 **17 Claims**

1. A bar code location and recognition system for locating a digitized image of a bar code, comprising:

means for converting an image of the surface of an object imprinted with a bar code pattern having at least two bars of different pitch to a digital image having an array of black and white pixels in rows and columns;

means for generating an L-shaped pattern characteristic of a digitized image of the bar code pattern when black pixels are summed along segments of each row containing a portion of the digital image of the bar code pattern; and



means for locating the coordinates of the L-shaped pattern in a region within the array of pixels containing the digitized image of the bar code pattern.

5,073,955

METHOD FOR RECOGNIZING PREVIOUSLY LOCALIZED CHARACTERS PRESENT IN DIGITAL GRAY TONE IMAGES, PARTICULARLY FOR RECOGNIZING CHARACTERS STRUCK INTO METAL SURFACES

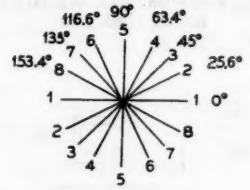
Christian Evers, Baldham, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 9, 1990, Ser. No. 521,014

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1989, 3919831

Int. Cl.[5] G06K *9/00, 9/48*

U.S. Cl. 382—21 **15 Claims**



1. Method for recognizing previously localized characters present in digital gray tone images, particularly for recognizing characters struck into metal surfaces,

for training a trainable character recognition means for recognizing the localizing characters, comprising the steps of:

generating at least one or more reference characters having a plurality of pixels and portrayed line-like and storing these reference characters in a working memory of the trainable character recognition means, whereby the number and nature of the reference characters correspond to a character set from which the localized characters are to be recognized;

assigning a direction to every pixel of every reference character;

determining a scatter function for the directions assigned to pixels of every reference character;

determining an angular comparison function for comparing reference directions with gray tone edge directions identified from a gray tone image of the localized characters; and

producing evaluation matrices on the basis of the scatter function and of the angular comparison function;

and for recognizing characters, the method further comprising the steps of:

reading a digitized and localized character to be recognized into the character recognition means, and providing therefrom an appertaining gray tone image;

pre-processing the character to be recognized using at least the appertaining gray tone image so that a classification of the appertaining character can be implemented;

comparing the pre-processed character to all reference characters previously learned by the character recognition means;

using a majority decision for determination of a reference character that most closely coincides to the character to be recognized; and

generating a result signal, indicative of the majority decision, from the character recognition means for further processing.

5,073,956

APPARATUS FOR CONVERTING IMAGE OUTLINE DATA INTO DOT DATA REPRESENTATIVE OF DOTS TO BE FORMED

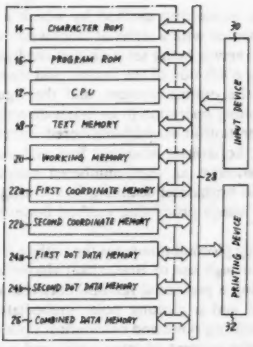
Naoyuki Kawamoto, Toki; Hitoshi Yoshida, Kohnan, and Takahiro Kanegae, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Oct. 23, 1989, Ser. No. 425,604

Claims priority, application Japan, Oct. 25, 1988, 63-269074; Mar. 29, 1989, 1-78782

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—22 **9 Claims**



1. A data converting apparatus for converting a batch of outline data representative of an outline of an image such as a letter, a symbol and a graphical representation, into a batch of dot data indicative of whether a dot is to be formed in each of picture elements positioned in a coordinate system in which said outline data is defined, said apparatus comprising:

coordinate calculating means for calculating coordinate values of intersections between said outline of said image in said coordinate system and a plurality of parallel scanning lines superimposed on said outline in said coordinate system;

coordinate storing means for storing the coordinate values calculated by said coordinate calculating means, such that the coordinate values for each of said scanning lines are arranged in order of the magnitude of the values and adjacent two of the ordered values are paired as a pair of coordinate values; and

dot data preparing means for preparing a batch of dot data such that successive bits of the dot data corresponding to a plurality of successive picture elements which consist of two picture elements represented by said pair of coordinate values and at least one picture element between said two picture elements are set at one time such that each of said successive bits indicates a dot to be formed in the corresponding picture element.

5,073,957

GRAPHIC EDITING SYSTEM

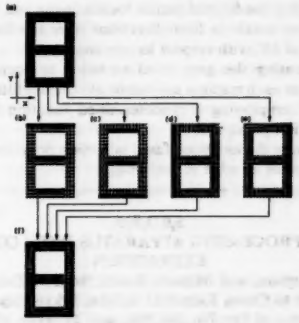
Kunio Seto, Inagi; Chizuko Yamamoto, Fuchu, and Kiyoshi Watanabe, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,138

Claims priority, application Japan, Sep. 13, 1987, 62-228711; Sep. 13, 1987, 62-228712; Sep. 13, 1987, 62-228713

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—22 **12 Claims**



1. A graphic editing system comprising:

memory means for storing an image pattern composed of dot data;

first logic product means for forming the logic product of the image pattern stored in said memory means and an inverted image pattern formed from an image pattern obtained by moving the first-mentioned image pattern by a dot upwards;

second logic product means for forming the logic product of the image pattern stored in said memory means and an inverted image pattern formed from an image pattern obtained by moving the first-mentioned image pattern by a dot downwards;

third logic product means for forming the logic product of the image pattern stored in said memory means and an inverted image pattern formed from an image pattern obtained by moving the first-mentioned image pattern by a dot rightwards;

fourth logic product means for forming the logic product of the image pattern stored in said memory means and an inverted image pattern formed from an image pattern obtained by moving the first-mentioned image pattern by a dot leftwards;

logic sum means for forming an image pattern having the logic sum of the logic products obtained by said first, second, third and fourth logic product means; and

means for obtaining vector coordinate information and attribute information from the image pattern obtained by said logic sum means.

5,073,958

METHOD OF DETECTING EDGES IN IMAGES

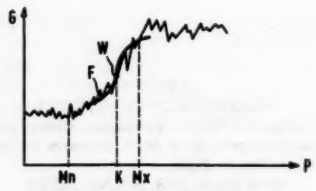
Martin W. Imme, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 11, 1990, Ser. No. 556,782

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1989, 3923449

Int. Cl.[5] G06K 9/48

U.S. Cl. 382—22 15 Claims



1. A method of detecting edges in an image which occur as grey levels of pixels in a two-dimensional image matrix comprising:

electronically filtering said grey levels to produce a filtered matrix having local minima and maxima;

determining the filtered matrix local minima and maxima of the grey levels in four directions over the image at an angle of 45° with respect to one another;

approximating the grey level variation in each direction between each maxima and minima in the nonfiltered image matrix employing a predetermined function having an inflection point; and

determining the location of said inflection point to detect the position of an edge in said image.

5,073,959

IMAGE PROCESSING APPARATUS WITH CONTOUR EXTRACTION

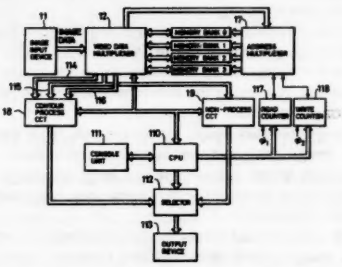
Takashi Sugiura, and Mitsuru Kurita, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 344,500, Apr. 27, 1989, abandoned, which is a continuation of Ser. No. 110,784, Oct. 21, 1987, abandoned. This application Sep. 28, 1990, Ser. No. 590,586

Claims priority, application Japan, Oct. 24, 1986, 61-254400; Oct. 24, 1986, 61-254402

Int. Cl.[5] G06K 9/48

U.S. Cl. 382—22 11 Claims



1. An image processing apparatus comprising:

input means for inputting digital image data representing an image;

first process means for performing a contour extracting process on the digital image data from said input means and forming contour data representing a contour of the image;

second process means for performing a contour emphasis process on the digital image data from said input means by using the contour data formed by said first process means, and forming contour-emphasis processed data; and

selecting means for selecting one of the contour data formed by said first process means and the contour-emphasis processed data formed by said second process means and outputting the selected data.

5,073,960

IMAGE PROCESSING METHOD USING IMPROVED BRESENHAM ALGORITHM IN CREATING AN OUTLINE OF A FIGURE TO BE PAINTED AND APPARATUS ADOPTING THE METHOD

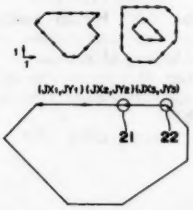
Yoshiyuki Nakai, Nara; Kazuo Maruta; Tatsushi Nakajima, both of Yamatokooriyama, and Seido Kawanaka, Yawata, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 17, 1990, Ser. No. 524,428

Claims priority, application Japan, May 18, 1989, 1-125295; May 18, 1989, 1-125296; May 26, 1989, 1-134369; Jun. 20, 1989, 1-158031; Aug. 11, 1989, 1-208630

Int. Cl.[5] G06F 3/153

U.S. Cl. 382—22 7 Claims



1. An image processing method by which a contour of a figure is represented with a series of clockwise outline vectors, a sense of each vector being set such that the figure be painted out by painting a left side of the vector, and then, an outline is created from the outline vectors, and the figure is painted through a scanning operation in an x-axis direction by starting a painting operation at an odd-numbered intersection of the outline and a horizontal scanning line and suspending the painting operation at an even-numbered intersection of the outline and the horizontal scanning line during the scanning operation, the image processing method comprising the steps of:

(a) calculating plotting points for the outline from the outline vectors through use of Bresenham algorithm;

(b) calculating a positional relation between a current plotting point and a plotting point immediately before the current plotting point and calculating a positional relation between the current plotting point and a point immediately after the current plotting point;

(c) storing in a variation memory unit a positional variation in a y-axis direction between the current plotting point and the plotting point immediately before the current plotting point, which is extracted based on the calculated positional relations, wherein when a position of the current plotting point varied from that of the plotting point immediately before, the variation is stored as a current value, when a position of the plotting point immediately after varies from that of the current plotting point, this variation is stored, and when the position of the current plotting point does not vary relative to both the plotting points immediately before and after the current plotting point, a previous value is maintained;

(d) creating the outline by plotting outline components one after another in accordance with the following rule,

(i) when the current plotting point and the plotting points immediately before and after have a horizontally reciprocating relation and these three plotting points are aligned in parallel with a x-axis direction, plotting an outline component is done at the current plotting point or a plotting point one dot shifted in the x-axis direction

from the current plotting point based on the positional variation stored in the variation memory unit, and

(ii) when the current plotting point and the plotting points immediately before and after do not have a horizontally reciprocating relation, plotting an outline component is done either at the current plotting point, at a plotting point one dot shifted in the x-axis direction from the current plotting point, at both the current plotting point and a plotting point one dot shifted in the x-axis direction from the current plotting point, or at neither point; and

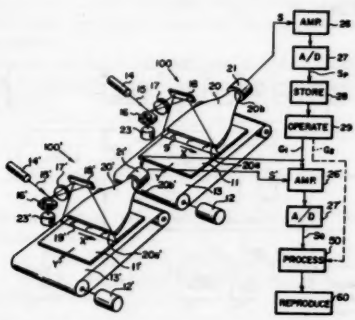
(e) painting pixels between an odd-numbered intersection of the outline and a horizontal scanning line and an even-numbered intersection of the outline and the horizontal scanning line, inclusive of a pixel at the odd-numbered intersection but exclusive of a pixel at the even-numbered intersection.

5,073,961

METHOD FOR JUDGING THE CORRECTNESS OR INCORRECTNESS OF A DETECTED SUBDIVISION PATTERN OF RADIATION IMAGES

Hideya Takeo, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 29, 1989, Ser. No. 414,230
Claims priority, application Japan, Oct. 5, 1988, 63-251617
Int. Cl.[5] G06K 9/56
U.S. Cl. 382—27 1 Claim



1. A method for judging the correctness or incorrectness of a subdivision pattern which has been detected on a recording medium, which comprises the steps of:

i) detecting the subdivision pattern in cases where the entire recording area of a recording medium was divided into a plurality of regions and radiation images were recorded in the respective regions, the subdivision pattern being determined from the characteristics of an image signal made up of a series of image signal components and obtained from a recording medium which has been subjected to radiation image recording,

ii) calculating a characteristic value for the image signal components corresponding to each of the subdivided regions,

iii) comparing said characteristic value with a predetermined value, and

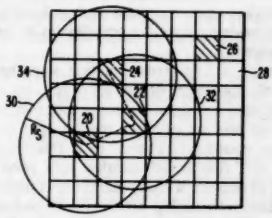
iv) basing a judgment as to whether the detected subdivision pattern is or is not correct on the results of the comparison made between said characteristic value corresponding to each of the subdivided regions and said predetermined value.

5,073,962

GENERALIZED NEIGHBORHOODS PARAMETER TRANSFORM FOR IMAGE FEATURES EXTRACTION

Andrea Califano, New York, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 18, 1989, Ser. No. 395,888
Int. Cl.[5] G06K 9/46
U.S. Cl. 382—27 18 Claims



1. An image feature extraction system for extracting geometric features from an image comprising:

partitioning an image into a set of neighborhoods;

coupling a first neighborhood with at least one second neighborhood and extracting parameters of features contained in said first and second neighborhoods in order to identify features in said first and second neighborhoods;

creating a node associated with each identified feature if such node does not already exist and assigning an initial support value to said node;

changing said support value whenever a node already exists for an identified feature;

performing clustering on said nodes in parameter space to eliminate nodes for noisy and erroneous features; and

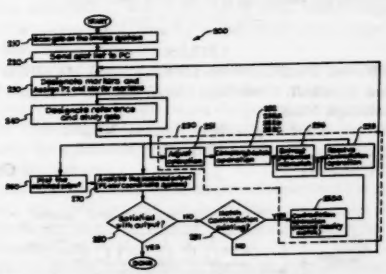
providing an output indicative of an image feature in the image.

5,073,963

COMPUTERIZED METHOD OF MATCHING TWO-DIMENSIONAL (2-D) PATTERNS

David w. Sammons; Wen-Jeng Ko, and Yi-Cheng Liu, all of Tucson, Ariz., assignors to Arizona Technology Development Corp., Tucson, Ariz.

Filed May 25, 1990, Ser. No. 528,816
Int. Cl.[5] G06K 9/62, 9/00; G06F 15/00
U.S. Cl. 382—30 22 Claims
MICROFICHE APPENDIX INCLUDED
(5 Microfiche, 88 Pages)



16. A method of matching protein spot patterns in a plurality of two-dimensional gel electrophoretograms (2-D gels), said method comprising the steps of:

(a) image scanning each of said plurality of 2-D gels and producing corresponding spot data files for each 2-D gel that contain logistic data and spot physical characteristics data in a scan coordinate system;

(b) identifying spot members in each of said plurality of 2-D

gels that bound investigative spot patterns and designating said identified spot members as marker spot members;

(c) designating one of said plurality of 2-D gels as a reference 2-D gel, said reference 2-D gel having an associated reference spot data file including a set of reference marker spot members and unknown reference spot members having respective coordinates in said scan coordinate system;

(d) designating at least one of remaining ones of said plurality of 2-D gels as a study 2-D gel, said study 2-D gel having an associated study spot data file including a set of study marker spot members and unknown study spot members having respective coordinates in said scan coordinate system;

(e) performing a first transformation step that transforms positional coordinates of said set of reference marker spot members, said unknown reference spot members and each member of said set of study marker spot members from said scan coordinate system to a reference coordinate system, said first transformation step resulting in each member of said set of study marker spot members being in a registered relationship with a corresponding member of said set of reference marker spot members;

(f) performing a second transformation step that transforms positional coordinates of each of said unknown study spot members from said scan coordinate system to said reference coordinate system, said second transformation comprising:

(i) determining an effective range associated with each study marker spot member of said set of study marker spot members,

(ii) determining an attraction pairing relationship between a particular study marker spot member and a particular unknown study spot member, said attraction pairing relationship being determined utilizing said effective range as determined for said particular study marker spot member,

(iii) determining positional coordinates in said reference coordinate system of said particular unknown study spot member by adjusting original scan coordinates by shift amounts equivalent to transformation shift amounts of said particular study marker spot member that resulted from said first transformation step, and inputting said determined positional coordinates into at least one adjusted data file containing new coordinate information for all spot pattern members manipulated by said first and second transformation steps;

(iv) repeating said (ii) and (iii) steps for all unknown study spot members;

(g) repeating said steps (d), (e) and (f) on any remaining one of said plurality of 2-D gels; and

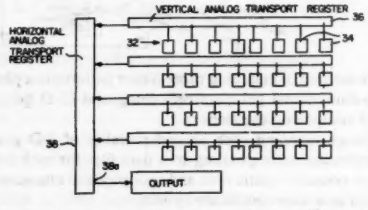
(h) comparing coordinates of all spot pattern members in said at least one adjusted data file and producing results identifying matching spot pattern members.

5,073,964

SIGNAL PROCESSING DEVICE AND METHOD

Howard Resnikoff, Cambridge, Mass., assignor to Aware, Inc., Cambridge, Mass.

Filed Aug. 4, 1989, Ser. No. 389,592
Int. Cl.[5] G06K *9/36*
U.S. Cl. 382—41 **21 Claims**



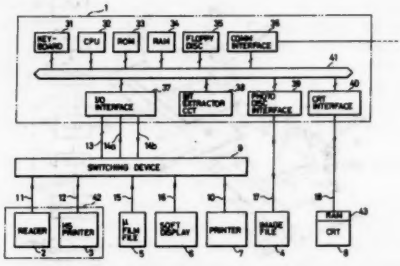
1. A signal processing device, comprising 2^N successively adjacent substantially congruent Nth-order processing elements positioned on a surface, each of said processing elements comprising a transducing member, where N is a positive integer, each of said 2^N Nth-order processing elements being aggregatable into one of 2^{N-k} (N−k)th-order non-overlapping aggregates of 2^k successively adjacent Nth-order processing elements for all values of k, where $0<k\leqq N$; the Nth-order processing elements of each (N−k)th-order aggregate substantially covering a substantially continuous portion of said surface and defining an (N−k)th-order processing element, being congruent to every other (N−k)th-order processing element for the same value of k, and having a shape which is substantially geometrically similar to the shape of each (N−k)th-order processing element for all other values of k; each Nth-order processing element receiving energy input thereto and converting said input energy to an output signal proportional to said input energy.

5,073,965

IMAGE PROCESSING SYSTEM

Motofumi Konishi, Yokohama; Yoshio Ando, Chigasaki; Toshio Iwaya, Shiki; Kanou Tanaka; Masahide Kotera, both of Yokohama; Norio Hashimoto, Tokyo; Yasutoshi Sugita, Urayasu; Yoshitaka Sano, Matsudo, and Satoshi Ono, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 57,652, Jun. 8, 1987, abandoned, which is a continuation of Ser. No. 658,410, Oct. 5, 1984, abandoned.
This application Mar. 20, 1989, Ser. No. 326,476
Claims priority, application Japan, Oct. 12, 1983, 58-191341
Int. Cl.[5] G06K *9/42*
U.S. Cl. 382—47 **10 Claims**



1. An image displaying system comprising:

generating means for generating image information single page by single page, and size information indicating size of the image information;

processing means for processing said image information generated by said generating means;

display means for forming an erasable image on a recording medium on the basis of said image information processed by said processing means and for displaying said image formed on said recording medium at a display section, wherein said display means displays all the image information for a single page; and

control means for controlling said processing means such that when said size information generated by said generating means indicates that the size of the image information is smaller than that of said display section, said image information is magnified according to the size information and is formed,

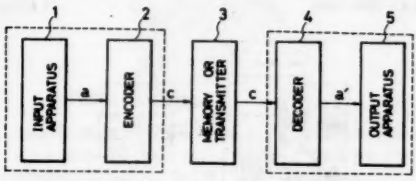
wherein said control means magnifies said image information by means of data interpolation on predetermined bits of said image information.

5,073,966

IMAGE DATA PROCESSING APPARATUS

Hiroaki Sato, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 338,333, Apr. 13, 1989, abandoned, which is a continuation of Ser. No. 31,210, Mar. 30, 1987, abandoned, which is a continuation of Ser. No. 605,670, Apr. 30, 1984, abandoned. This application Jul. 9, 1990, Ser. No. 550,224
Claims priority, application Japan, May 10, 1983, 58-80085
Int. Cl.[5] G06K 9/36
U.S. Cl. 382—56 10 Claims



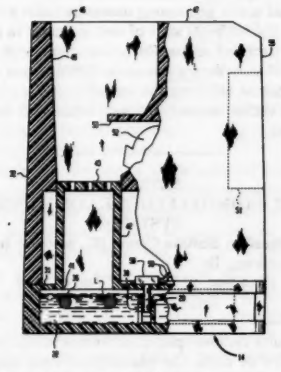
1. An image data processing apparatus comprising:
input means for inputting image data of m bits for each pixel, each of the image data representing one of M tone levels ($M \leqq 2^m$);
generation means for generating position information relating to each pixel; and
conversion means for converting the image data input from said input means into code data of n bits ($n<m$) for each pixel,
wherein the M tone levels are divided, with K threshold levels ($K<2^n$) into $K+1$ ranges which correspond to $K+1$ dot patterns each composed of plural dots, and the converted code data indicates one of the $K+1$ ranges in which the tone level represented by the image data is included, and
wherein the K threshold levels are varied in accordance with the position information generated by said generating means.

5,073,967

HUMIDIFIER DEVICE WITH DELAYED ENERGIZATION

Frank Marino, Upton, Mass., assignor to Duracraft Corporation, Sudbury, Mass.

Filed Jul. 8, 1991, Ser. No. 726,678
Int. Cl.[5] F22B 1/28
U.S. Cl. 392—406 15 Claims



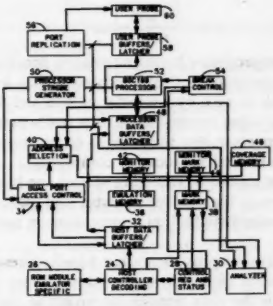
1. Humidifier apparatus comprising:
base means defining a liquid reservoir;
electrically energized humidification means adapted to induce dispersion of liquid retained by said reservoir;
power supply means for supplying electrical current to said humidification means;
control circuit means connecting said power supply means to said humidification means and including switch means operable in an active state to produce energizing current flow between said power supply means and said humidification means and operable in an inactive state to prevent energizing current flow therebetween;
sensing means operatively coupled to said switch means and adapted to sense the liquid level in said reservoir, said sensing means adapted to provide said active state for said switch means in response to a minimum liquid level in said reservoir and to provide said inactive state for said switch means in response to a liquid level in said reservoir less than said minimum liquid level; and
delay means for delaying said energizing current flow between said power supply means and said humidification means for a given period after the level of liquid in said reservoir reaches said minimum liquid level.

5,073,968

METHOD AND APPARATUS FOR MARKING EMULATION ANALYSIS STATES

Robert D. Morrison, Colorado Springs, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 9, 1988, Ser. No. 230,807
Int. Cl.[5] G06F 11/00, 11/28
U.S. Cl. 395—500 7 Claims



1. An apparatus for use in instruction analysis for marking emulation states from a program under text and for recreating a list of instructions corresponding to at least a portion of the program under test from such emulation states, which program under test comprises a plurality of individual instructions, the apparatus comprising:
a memory for storing marks corresponding to the individual instructions in the program under test;
a target processor for executing the program under test and for transmitting emulation state information associated with the execution of individual instructions in the program under test;
an analyzer, connected to the target processor and the memory, for collecting the emulation state information from the target processor and for reading the marks from the memory; and
a host controller, connected to the memory and the analyzer, for analyzing the emulation state information collected in the analyzer, prior to execution by the target processor, to generate marks associated with the individual instructions according to a predetermined coding scheme, wherein said marks provide an indication of the byte length of an emulation state, for storing the marks in the memory and for dequeing the emulation state information collected in the analyzer into a list of instructions

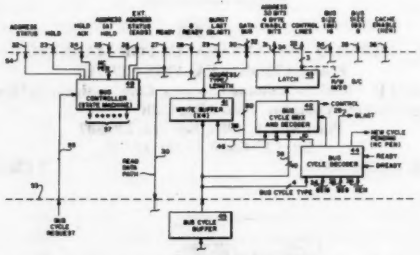
corresponding to the individual instructions for at least a portion of the program under test, which dequeing occurs in response to the state information and the marks associated with a particular instruction, wherein when dequeing is to occur for emulation state information associated with a particular individual instruction the mark associated with that individual instruction is read from the memory into the analyzer.

5,073,969

MICROPROCESSOR BUS INTERFACE UNIT WHICH CHANGES SCHEDULED DATA TRANSFER INDICATIONS UPON SENSING CHANGE IN ENABLE SIGNALS BEFORE RECEIVING READY SIGNAL

Kenneth D. Shoemaker, Saratoga, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Aug. 1, 1988, Ser. No. 227,078
Int. Cl.[5] G06F *3/00*
U.S. Cl. 395—725 **3 Claims**



1. In a microprocessor having an internal data bus of n bytes, where n is greater than 2, said microprocessor for providing address signals or an n byte transfer of data and for receiving a ready signal when external memory is ready to transfer data, said microprocessor also including a cache memory, an improvement is said microprocessor comprising:

a first input means for receiving at least one byte size signal representing the number of bytes said external memory will transfer with said microprocessor on said next ready signal;

output means for providing a last signal representing that a data transfer request by said microprocessor will be satisfied with the data transfer occurring at the next ready signal;

logic means for generating said last signal, coupled to said first input means and to said output means, said logic means for keeping track of the number of bytes of data transferred after said microprocessor provides said address signals and for periodically sensing said size signal, said logic means being able to change said last signal with each sensed change of said sized signal for said ready signal;

a second input means for receiving a cache enable signal generated externally to said microprocessor which indicates if data sought to be transferred to said microprocessor by said address signals is to be stored in said cache memory;

wherein said cache enable signal is coupled to said logic means and is periodically sensed and used for generating said last signal, said logic means being able to change said last signal with each sensed change of said cache enable signal for said ready signal; and

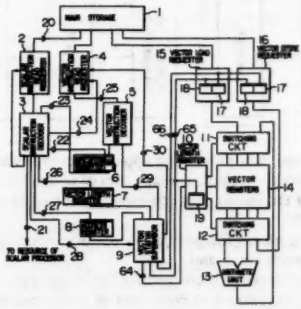
wherein said microprocessor further comprises a third input means for receiving a burst ready signal which indicates that said external memory is ready to transfer bursts of data in response to said address signals, said burst signal being coupled to said logic means and used for generating said last signal.

5,073,970

VECTOR PROCESSING APPARATUS ALLOWING SUCCEEDING VECTOR INSTRUCTION CHAIN PROCESSING UPON COMPLETION OF DECODING OF A PRECEDING VECTOR INSTRUCTION CHAIN

Tamoo Aoyama, Hadano; Yasuhiro Inagami, Kodaira, and Hiroshi Nurayama, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Computer Engineering Co., Ltd., Hadano, both of, Japan

Continuation of Ser. No. 926,444, Nov. 3, 1986, abandoned. This application Jan. 24, 1990, Ser. No. 471,667
Claims priority, application Japan, Nov. 13, 1985, 60-252798
Int. Cl.[5] G06F *15/76, 9/30*
U.S. Cl. 395—800 **7 Claims**



1. A vector processing apparatus, comprising:

means for processing a vector instructional chain, the vector processing means including a vector instruction decoder and means for executing a vector instruction;

means for processing a scalar instruction, the scalar processing means including means for commanding the processing, inclusive of decoding and execution, of vector instructions in said vector instruction chain by said vector processing means in response to a scalar instruction which commands effecting a start of the processing of said vector instruction chain; and

means for effecting the initiation of the processing of a next vector instruction chain by said vector processing means in response to an end of the decoding of the last vector instruction of a preceding vector instruction chain, wherein said means for effecting is included in the scalar processing means and includes an indicator which is set in response to the initiation of decoding of said vector instruction chain by said vector instruction decoder and is reset in response to the decoding of a vector instruction at the end of said vector instruction chain;

wherein said scalar processing means includes a flip-flop for fetching the set/reset state of said indicator in response to a newly decoded scalar instruction commanding the processing of said vector instruction chain, said scalar processing means effecting the initiation of the processing of the next vector instruction chain while said flip-flop is in a set state.

5,073,971

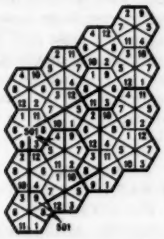
CELLULAR RADIOTELEPHONE COMMUNICATIONS SYSTEM

Dennis R. Schaeffer, Buffalo Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 5, 1989, Ser. No. 402,739
Int. Cl.[5] H04S *3/16*
U.S. Cl. 455—33 **19 Claims**

12. A cellular radiotelephone communications system having a plurality of cells, the plurality of cells being located substantially adjacent to each other in a first and a second direction, the system comprising:

a) a plurality of frequency groups, a first frequency of a first frequency group radiating into a 60° sector of a first cell;
b) the first frequency of the first frequency group radiates in a substantially opposite direction from the first frequency of a second frequency group; and



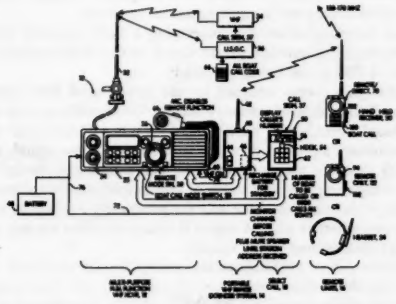
c) uniform reuse of the first frequency group in other cells at a less distance in the first direction than in the second direction.

5,073,972

MODULAR COMMUNICATIONS SYSTEM INCLUDING A PORTABLE UNIT RANGE EXTENDER AND SELECTIVE-CALL SYSTEM

Robert K. Tendler, 19 Lawrence Ave., Chestnut Hill, Mass. 02167, and Frank P. Karkota, Jr., Cowdry Hill Rd., Westford, Mass. 01886

Filed Jan. 12, 1989, Ser. No. 296,514
Int. Cl.[5] H04B *1/16*
U.S. Cl. 455—35 **5 Claims**



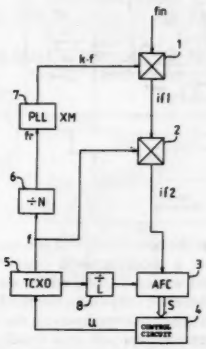
1. A system for providing a selective call function to a transceiver having a speaker comprising:
means for muting said speaker;
means coupled to the output of the receiver section of said transceiver of unmuting said speaker responsive to detection of the receipt by said receiver section of a predetermined code unique to said transceiver, or a universal emergency/priority code; and,
means for switching said transceiver to a predetermined emergency channel when said emergency/priority code is detected, whereby all transceivers provided with said system which are within the broadcast range of the transmitter sending the universal emergency/priority code will be unmuted to receive emergency communications and will be switched to said emergency channel.

5,073,973

METHOD AND CIRCUITRY FOR AUTOMATIC CONTROL OF THE FREQUENCY FOR A RADIO TELEPHONE

Matti Ylivakeri, Turku, Finland, assignor to Nokia-Mobira Oy, Salo, Finland

Filed Jul. 6, 1989, Ser. No. 376,117
Claims priority, application Finland, Aug. 19, 1988, 883855
Int. Cl.[5] H04B *1/10*
U.S. Cl. 455—76 **10 Claims**



1. A method for controlling the frequency of a radio telephone having an input for a received signal, comprising:
generating a local oscillator frequency with a signal controlled local oscillator;
coupling the local oscillator frequency as the input signal to a phase-locked loop;
mixing the frequency of the received signal with the phase-locked loop output frequency in a first mixer whereby a first mixer output frequency is created;
mixing the first mixer output frequency with the local oscillator frequency in a second mixer whereby a second mixer frequency is created;
calculating a base time interval required to count a specified number of pulses generated by the local oscillator;
counting the number of pulses generated by the second mixer during the base time interval so that a second mixer frequency deviation is calculated; and
controlling the local oscillator frequency based upon the second mixer frequency deviation.

5,073,974

HOT STANDBY TRANSMITTER SWITCHING SYSTEM USING UPPER AND LOWER SIDEBAND WAVES

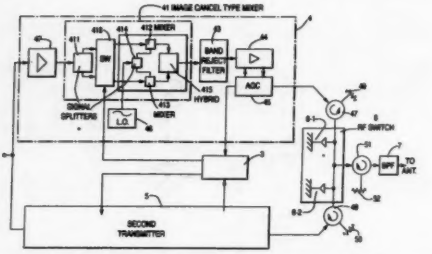
Akira Nishimura, Ohtawara, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 19, 1989, Ser. No. 452,359
Claims priority, application Japan, Dec. 20, 1988, 63-325044
Int. Cl.[5] H04B *1/02*
U.S. Cl. 455—103 **9 Claims**

1. A hot standby transmitter switching system of a radio transmitting apparatus, comprising:
a first transmitter and a second transmitter, each including an image-cancel type mixer for mixing a local frequency and a signal frequency and for outputting a radio frequency wave selected from an upper sideband wave and a lower sideband wave of the local frequency, each of said first and second transmitters outputting, an as output wave, the radio frequency wave output by the corresponding one of said image-cancel type mixers respectively installed therein, each of said image-cancel type mixers having a signal switch therein for determining whether the upper or lower sideband wave is to be output from said image-cancel type mixer;

a switch controller, coupled to said signal switches, for outputting control signals to each of said signal switches, so that said second transmitter selectively outputs one of the sideband waves which is different from that which said first transmitter outputs; and

a radio frequency switch, coupled to said switch controller and said first and second transmitters and controlled by said switch controller, for selectively outputting the output wave from the one of said first and second transmitters which outputs a predetermined one of the upper and lower sideband waves, so that, while one of said first and second transmitters is outputting the predetermined one of the upper and lower sideband waves, the other of said first and second transmitters acts as a standby transmitter by outputting the other of the upper and lower sideband waves.

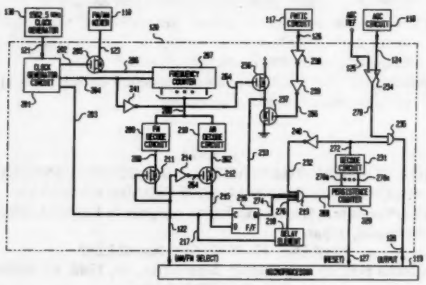


5,073,975

STOP ON STATION CIRCUIT INCLUDING CENTER CHANNEL DETECTOR

Seyed R. Zarabadi, Columbus, Ohio; Myron G. Padgett, Greentown, and Richard A. Kennedy, Russiaville, both of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 28, 1989, Ser. No. 399,948
Int. Cl.[5] H04B *1/16*
U.S. Cl. 455—161 4 Claims



1. A radio receiver comprising:

a stop on station circuit comprising:

field strength measuring means for evaluating received station signals for signal strength and for generating corresponding field strength pass output signals;

frequency measuring means for evaluating received station signals for correct frequency and for generating corresponding frequency pass output signals;

said frequency measuring means comprises clock means for defining evaluation time periods and a plurality of sampling time periods within each evaluation period, measuring means for measuring the frequency of a received station signal in each of said sampling time periods for generating sample pass output signals, persistence evaluation means for counting the number of said sample pass output signals received during each evaluation time period and for generating said frequency pass signals if the number of counts in an evaluation time period equals or exceeds a defined threshold value;

said frequency measuring means further including gating means for gating said sample pass output signals to said persistence evaluation means;

noise measuring means for evaluating the level of ultrasonic noise in demodulated received station signals and for generating corresponding noise pass and no pass signals for respectively enabling and disabling said gating means;

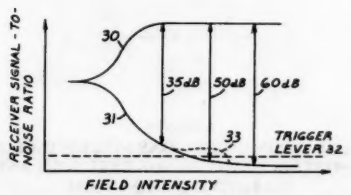
decision means comprising second gating means responsive to said field strength pass and said frequency pass signals for generating corresponding stop on station signals.

5,073,976

SIGNAL-TO-NOISE RATIO INDICATING CIRCUIT FOR FM RECEIVERS

John F. Kennedy, Garden City, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 30, 1989, Ser. No. 443,626
Int. Cl.[5] H04B *17/02*
U.S. Cl. 455—161 20 Claims



1. Apparatus for detecting the reception of an FM signal having a predetermined signal quality, said apparatus comprising:

demodulator means for recovering signal information from said FM signal;

out-of-band filter means coupled to said demodulator means for isolating a noise signal in a frequency range substantially unaffected by said signal information;

field intensity means for generating a field intensity signal having a magnitude proportional to the field intensity of said FM signal being received;

signal gain means coupled to said out-of-band filter means and to said field intensity means for amplifying said isolated noise signal by a gain which is a function of said intensity signal to produce an amplified noise signal; and

peak detector means coupled to said signal gain means for comparing the peak value of said amplified noise signal to a predetermined value and for producing a signal to indicate whether an FM signal is being received having said predetermined signal quality.

5,073,977

HIGH FREQUENCY BROAD-BAND MIXING CIRCUIT INCLUDING AN ELECTROLYTIC CAPACITOR IN PARALLEL WITH A LOCAL OSCILLATOR INPUT PORT

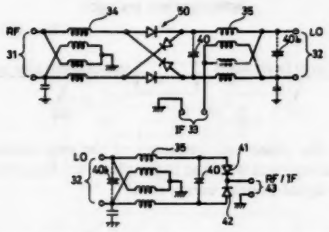
Kazunari Kawahata, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Continuation of Ser. No. 233,210, Aug. 17, 1988, Pat. No. 4,979,233. This application Aug. 22, 1990, Ser. No. 571,091
Claims priority, application Japan, Aug. 19, 1987, 62-206053
The portion of the term of this patent subsequent to Dec. 18, 2007, has been disclaimed.
Int. Cl.[5] H04B *1/26*
U.S. Cl. 455—330 5 Claims

1. A broad-band mixing circuit including a first port adapted to receive a radio frequency signal and a second port adapted to receive a local oscillation signal, comprising:

mixing means for outputting an intermediate signal as a

function of said radio frequency signal and said local oscillating signal received via respective pairs of input lines form said first and second ports, respectfully; and wherein



said second port for said local oscillation signal comprises an input port which has a pair of input terminals and a non-linear element which transfers signals from said input port to said mixing means via said pair of input lines;

an electrolytic capacitor being connected between the input port and ground.

5,073,978

BOX-SHAPED FRAME FOR REMOVEABLE CAR RADIOS, ADJUSTABLE IN DEPTH TO FIT RADIO SETS OF DIFFERENT LENGTHS

Giovanni Mastrippolito, Via Carlo Marx, 185, 20099 Sesto S. Giovanni (Milano), Italy

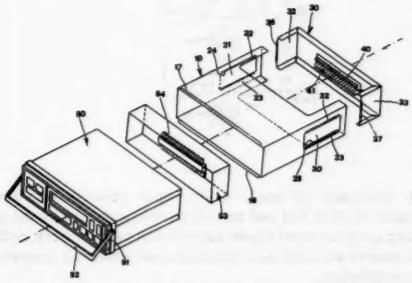
PCT No. PCT/IT89/00025, § 371 Date Nov. 5, 1990, § 102(e) Date Nov. 5, 1990, PCT Pub. No. WO89/10859, PCT Pub. Date Nov. 16, 1989

PCT Filed Apr. 14, 1989, Ser. No. 573,017

Claims priority, application Italy, May 4, 1988, 21171/88[U]

Int. Cl.[5] H04B *1/08*; H05K *7/00*

U.S. Cl. 455—346 **3 Claims**



1. Box-shaped housing for receiving a removeable radio set in motor vehicles, with an end section being adjustable relative to the box-shaped housing to adjust the length of the housing and thereby to enable the housing to accommodate any length of car radio by the presence of fastening means placed longitudinally along the walls of the box-shaped housing and of the end section,

characterized in that the fastening means include sets (22) (23) of opposingly situated notches (24) (25) placed on at least one of top and bottom edges of rectangular longitudinal windows (20) (21) cut in the sides (11) (12) of the box-shaped housing (10) and strip-shaped fixing projections (36) (37) on the edges of the elastic sides (32) (33) of the end section (30) turned outward away from the elastic sides (32) (33) and therefor towards the sides (11) (12) of the box-shaped housing (10) to correspond with said notches (24) (25), the length of said projections (36) (37) being practically the same as the distance between the respective bottom points of the opposingly situated sets (22) (23) of notches (24) (25) so that by manual action only and without tools overcoming the elastic resistance offered by the sides (32) (33) of the end section (33), said projections (36) (37) can penetrate into and another of said notches (24) (25), the end section (30) being held in the desired position by a close fit due to the elastic reaction of its sides (32) (33).

5,073,979

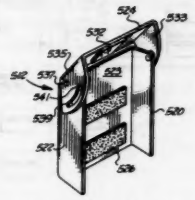
REFLECTOR FOR INFRARED REMOTE CONTROL TRANSMITTER

Edward L. Webb, 1780 W. Missouri Apt. E10, Phoenix, Ariz. 85015

Filed May 29, 1990, Ser. No. 529,637

Int. Cl.[5] H04B *10/00*

U.S. Cl. 359—142 **3 Claims**



1. An adapter for attachment to a housing of a remote control infrared transmitter for emitting infrared signals toward an infrared controlled appliance, the housing including

a top wall,

a bottom wall,

a pair of parallel side walls extending perpendicularly to said top and bottom walls,

a front wall extending perpendicularly to the top, bottom and side walls,

control means mounted in the top wall for controlling the infrared signals emitted by the transmitter, and

a transmission window formed in the front wall for allowing the infrared signals to pass out of the transmitter, said adapter comprising:

a) reflector means for receiving infrared signals from the transmitter and reflecting said signals toward an infrared controlled appliance;

b) positioning means secured to said reflector means for positioning said reflector means in front of the transmission window and at an oblique angle to said front wall to direct the infrared signals toward the appliance when the transmission window is not aimed directly at the appliance, said positioning means including

i) a pair of parallel side panels for attachment to the side walls of the housing, each of said side panels including

a top edge for extending parallel to the top wall of the housing, and

a front edge extending at an oblique angle to said top edge, and

ii) a front panel coplanar with the front edges of said side panels, said front panel including an inner surface;

c) coupling means for securing said positioning means to the housing of the transmitter; and

d) length adjustment means for varying the length of said front panel to correspond to the length of front wall of housings of different widths, said length adjustment means including

i) a first planar member integrally secured to one of said side panels, said first planar member having top and bottom edges turned in to form a pair of longitudinally extending channels, and

ii) a second planar member integrally secured to the other one of said side panels, said second planar mem-

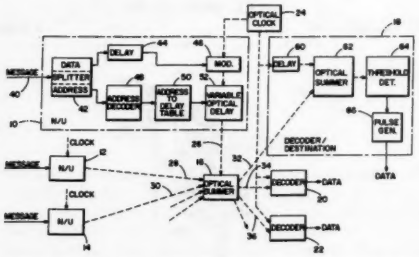
ber having top and bottom edges slidably received in said longitudinally extending channels.

5,073,980

PHOTONIC SWITCH EMPLOYING SHARED DATA TRANSMISSION FACILITY

Paul R. Prucnal, and Philippe A. Perrier, both of Princeton, N.J., assignors to The Trustees of Princeton University, Princeton, N.J.

Filed Aug. 29, 1989, Ser. No. 399,852
Int. Cl.[5] H04B *10/24*
U.S. Cl. 359—140 **3 Claims**



1. An optical message distribution system for routing messages from a plurality of remote sources to a plurality of remote destinations, each message including a destination address portion and a data portion, said distribution system including a plurality of network interface units, each said network interface unit comprising:

means for receiving a message from a remote message source and segregating the destination address portion of the message from the data portion;

decoding means for transforming said destination address portion into a time delay indication;

optical clock pulse generating means for generating optical clock pulses, a time between succeeding optical clock pulses termed a frame;

variable optical delay means responsive to said time delay indication, for delaying at least an initial clock pulse within a frame by the amount of said time delay indication;

means for modulating optical clock pulses in accordance with said data portion, and appending said modulated optical clock pulses to said frame that includes said initial delayed optical clock pulse, each said modulated optical clock pulse being delayed by the same amount in a frame as said delayed initial optical clock pulse; and

optical sum means for combining said optical pulses from each network interface unit and transmitting said pulses to said remote destinations.

5,073,981

OPTICAL COMMUNICATION BY INJECTION-LOCKING TO A SIGNAL WHICH MODULATES AN OPTICAL CARRIER

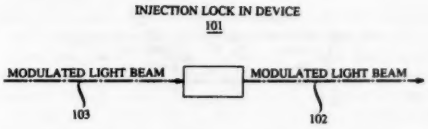
Clinton R. Giles, Middletown; Tingye Li, Rumson, and Thomas H. Wood, Highlands, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 146,918, Jan. 22, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 373,670
Int. Cl.[5] H04B *10/04*
U.S. Cl. 359—174 **25 Claims**

1. A method comprising,

directing an optical input into an all-optical pulser, the said optical input comprising an optical beam modulated by an first signal, which first signal comprises at least one first signal Fourier component, and the optical output of said all-optical pulser comprising an optical beam modulated by an second signal, which second signal comprises at least one second signal Fourier component, and

locking at least one characteristic of the second signal to at least one characteristic of the first signal,



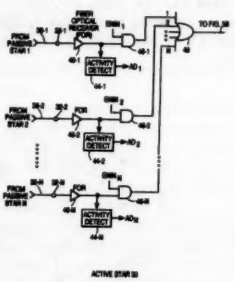
whereby the phase and frequency of the said second signal Fourier component is locked to the phase and frequency of the said first signal Fourier component.

5,073,982

APPARATUS FOR CONNECTING MULTIPLE PASSIVE STARS IN A FIBER OPTIC NETWORK

Jeffrey P. Viola, Brookhaven, Pa., and Joseph B. Sergi, Medford, N.J., assignors to General Electric Company, Camden, N.J.

Filed Sep. 1, 1989, Ser. No. 402,195
Int. Cl.[5] H04B *10/12*
U.S. Cl. 359—120 **14 Claims**



1. Apparatus for use in a fiber optic network which also includes at least first and second passive stars and means providing a bidirectional signal transmission path between each of said passive stars and said apparatus, said apparatus comprising in combination:

first means adapted for storing a value representing, with respect to each passive star, the time for the transmission of a pulse between said apparatus and each said passive star in both directions;

second means adapted to receive a first signal from any one of said passive stars;

third means adapted to transmit said first signal to each of said passive stars;

fourth means coupled to said second and third means and adapted to respond to said first signal received from said any one of said passive stars for blocking transmission of a signal back to that passive star during the time duration that said first signal is being received; and

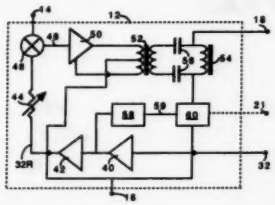
fifth means coupled top said first means and said second means and adapted to block receipt of a second signal from any other of said passive starts for a time which is a function of the duration of said first signal plus said value stored in said first means.

5,073,983

OPTICAL COMMUNICATION SYSTEM WITH REDUCED DISTORTION

Henry L. Pfizenmayer, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 5, 1990, Ser. No. 488,547
Int. Cl.[5] H04B *10/4*
U.S. Cl. 359—187 2 Claims



1. An optical signaling system comprising, electrically modulatable light emitting means for producing light output, modulator means for electrically modulating the light emitting means in response to one or more electrical input signals and one or more feedback signals, means for directing a first portion of the light output to a predetermined first signal destination and directing a second portion of the light output to an optical receiver having an electrical output related to the light output, wherein the modulator means comprises an electrical signal conditioning means for treating the electrical output of the optical receiver to derive a feedback signal proportional to the electrical input signal plus distortion products formed within the signaling system which, when combined with the input signal for modulating the light emitting means, improves the linearity of the optical signaling system, wherein the feedback signal further comprises a first feedback signal having an upper frequency at least equal an input signal frequency and a second feedback signal proportional to an average light optical output of the light emitting means, wherein the second feedback signal is time averaged over a time interval at least ten times a period of the electrical input signal, and wherein the signal conditioning means further comprises means for subtracting the first feedback signal from the input electrical signal, to provide a combined signal proportional at least in part to distortion products generated within the system but of opposite phase.

DESIGN PATENTS

GRANTED DEC. 17, 1991

ERRATA

For CLASS	See PATENT NO.
D14-191	322,464

322,353

TOE PROTECTOR INSERT

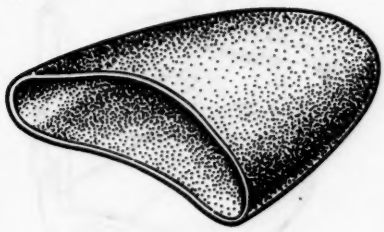
Douglas L. Bennett, 2A Bentley Street, Surrey Hills, Victoria 3127, Australia

Filed Sep. 22, 1988, Ser. No. 247,758

Claims priority, application Australia, Mar. 24, 1988, 0952/88

Term of patent 14 years

U.S. Cl. D2—277



322,354

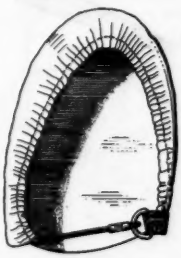
PROTECTIVE COVER FOR AN ATHLETIC SHOE

Joseph M. Tully, 800 Adams St., Apt. #8, Davis, Calif. 95616

Filed Nov. 20, 1989, Ser. No. 439,166

Term of patent 14 years

U.S. Cl. D2—277



322,355

SHOE SOLE

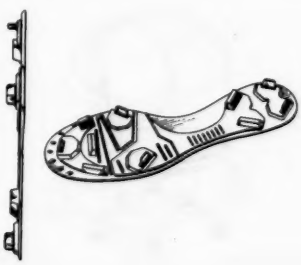
Takashi Arai, Kobe, Japan, assignor to ASICS Corporation, Hyogo, Japan

Filed Nov. 6, 1989, Ser. No. 432,212

Claims priority, application Japan, May 12, 1989, 1-17505

Term of patent 14 years

U.S. Cl. D2—320



322,356

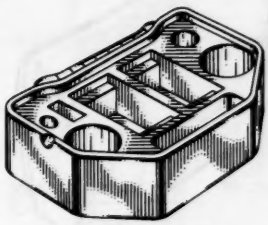
FISHERMAN'S STORAGE TRAY

Mark L. Harshaw, 7 Reflection Cove Ct., Hilton Head, S.C. 29926; Larry M. Kibler, 428 Deerwood Dr., and Phillip F. Keaton, 1511 Perez Dr., both of Orlando, Fla. 32825

Filed Feb. 28, 1989, Ser. No. 316,673

Term of patent 14 years

U.S. Cl. D3—38



322,357

LUGGAGE CASE

William L. King, Denver, Colo., assignor to Samsonite Corporation, Denver, Colo.

Filed Feb. 22, 1989, Ser. No. 313,778

Term of patent 14 years

U.S. Cl. D3—76

322,358

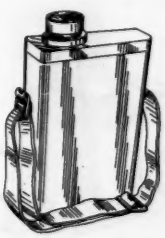
CANTEEN

Jeffrey M. Jacober, South Kingston, and Kenneth Longren, West Greenwich, both of R.I., assignors to SGI Inc., Warwick, R.I.

Filed Sep. 30, 1987, Ser. No. 102,906

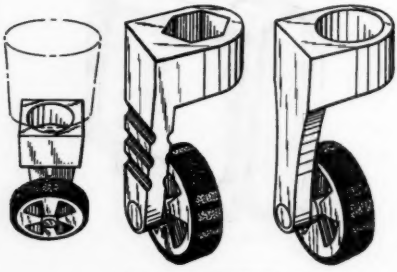
Term of patent 14 years

U.S. Cl. D3—30.1

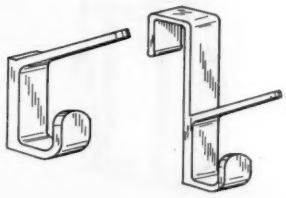


322,359
CASE
Berndt Diefenbach, Starnberg, Fed. Rep. of Germany, assignor to Carlton International PLC, Middlesex, United Kingdom
Filed Aug. 10, 1989, Ser. No. 392,097
Claims priority, application United Kingdom, Feb. 13, 1989, 1507095
Term of patent 14 years
U.S. Cl. D3—76

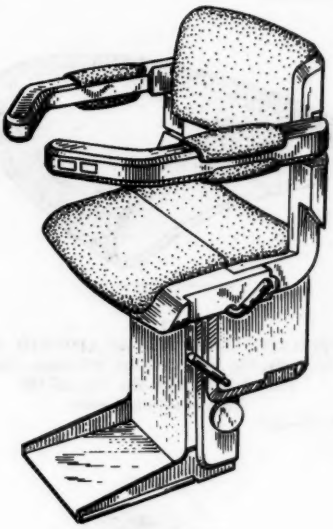
322,360
LIQUID APPLICATOR
John F. Tomlinson, Lititz, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.
Filed Oct. 27, 1988, Ser. No. 263,339
Term of patent 14 years
U.S. Cl. D4—122



322,361
HOOK
Sheldon H. Goodman, 4079 Princeton Blvd., South Euclid, Ohio 44121, and Steven E. Greenhut, 21646 Club Villa Ter., Boca Raton, Fla. 33433
Filed Dec. 2, 1988, Ser. No. 279,129
Term of patent 14 years
U.S. Cl. D6—323

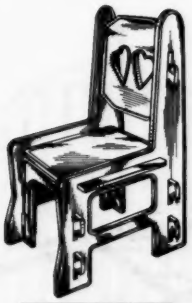


322,362
STAIRWAY LIFT CHAIR
David R. Voves, Racine; John F. Prendergast, Sr., Franklin; Thomas J. Green, West Bend, and John Sinchok, Oconomowoc, all of Wis., assignors to The Cheney Company, New Berlin, Wis.
Filed Dec. 5, 1988, Ser. No. 280,272
Term of patent 14 years
U.S. Cl. D6—360

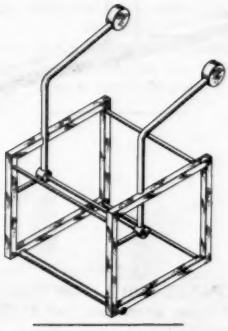


322,363
CHAIR
Tetsuya Narita, Funabashi, Japan, assignor to Okamura Corporation, Kanagawa, Japan
Filed Jan. 25, 1988, Ser. No. 148,360
The portion of the term of this patent subsequent to Sep. 10, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—366

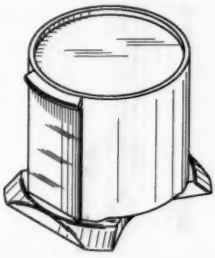
322,364
CHILD'S CHAIR
Billy E. Smith, 1236 Tramnier Rd., Castroville, Tex. 78009
Filed Aug. 11, 1988, Ser. No. 333,211
Term of patent 14 years
U.S. Cl. D6—368



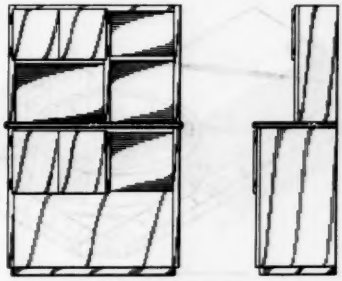
322,365
CHAIR FRAME OR SIMILAR ARTICLE
Scott Glendinning, 5515 Doyle St., #2, Emeryville, Calif. 94608
Filed Aug. 15, 1988, Ser. No. 232,374
Term of patent 14 years
U.S. Cl. D6—379



322,366
STORAGE CONTAINER FOR COMPUTER DISCS OR SIMILAR ARTICLE
Arthur Kohler, Mentor, Ohio, assignor to Chagrin Plastic Methods, Inc., Mentor, Ohio
Filed Feb. 14, 1989, Ser. No. 311,717
Term of patent 14 years
U.S. Cl. D6—407



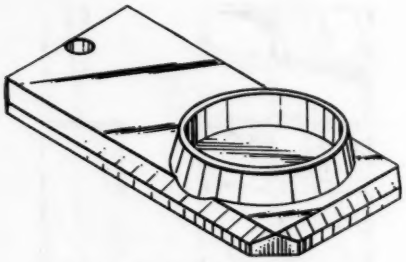
322,367
REFRESHMENT CENTER
Marty E. Sixt, Bellevue, Wash., assignor to Pure-Best Water, Inc., Bellevue, Wash.
Filed May 1, 1989, Ser. No. 345,530
Term of patent 14 years
U.S. Cl. D6—438



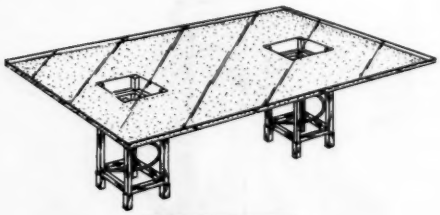
322,368
JEWELRY DISPLAY STAND
Marvin D. Blum, St. Louis, Mo., assignor to American Design Group, Inc., St. Louis, Mo.
Filed Jan. 23, 1989, Ser. No. 300,812
Term of patent 14 years
U.S. Cl. D6—460

322,369
PEDESTAL CHAIR
William B. Laird, 370 Lambeth Walk, York, Pa. 17403
Filed Feb. 23, 1989, Ser. No. 316,108
Term of patent 14 years
U.S. Cl. D6—364

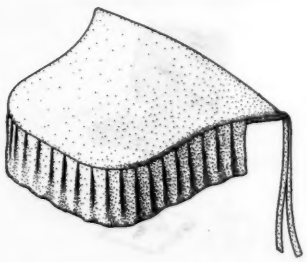
322,370
HOLDER FOR A COMPASS OR SIMILAR ARTICLE
Gregory L. Cross, and Wendell C. Cross, both of Arvada, Colo., assignors to Sun Company, Inc., Wheat Ridge, Colo.
Filed Oct. 18, 1988, Ser. No. 259,101
Term of patent 14 years
U.S. Cl. D6—466



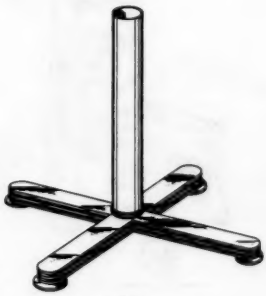
322,371
DINING TABLE
James Rosen, Los Angeles, Calif., assignor to The Pace Collection, Inc., Long Island City, N.Y.
Filed Feb. 28, 1989, Ser. No. 316,672
Term of patent 14 years
U.S. Cl. D6—487



322,372
SUNSHADE FOR AN INFANT'S CAR SEAT
Natalie A. Prowse, 300 Westminster Ave., Penticton British Columbia, Canada
Filed Mar. 30, 1989, Ser. No. 332,091
Claims priority, application Canada, Oct. 20, 1988, 20-10-88-7
Term of patent 14 years
U.S. Cl. D6—491

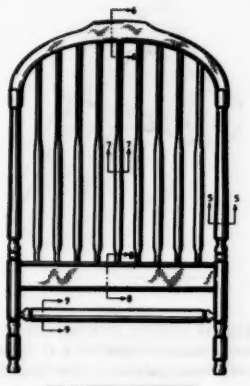


322,373
SUPPORT LEG FOR FURNITURE
David R. Gutgsell, Jasper, Ind., assignor to Ditto Sales, Inc., Jasper, Ind.
Filed Jul. 13, 1987, Ser. No. 72,613
Term of patent 14 years
U.S. Cl. D6—498

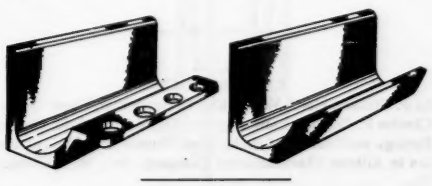


322,374
SIDE PANEL FOR A SHELVING UNIT
Olev Edur, 2441 Queen Street East, Unit 11, Toronto, Ontario, M4E 1H7, Canada
Filed Apr. 4, 1989, Ser. No. 332,954
Claims priority, application Canada, Oct. 19, 1988, 1910844
Term of patent 14 years
U.S. Cl. D6—492

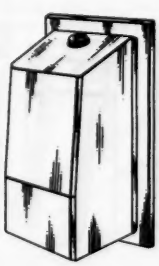
322,375
CRIB FOOTBOARD
Merlin A. Brunner, Appleton, and Harvey J. Draheim, Weyauwega, both of Wis., assignors to Simmons Juvenile Products Company, Inc., New London, Wis.
Filed Apr. 10, 1989, Ser. No. 335,986
Term of patent 14 years
U.S. Cl. D6—508



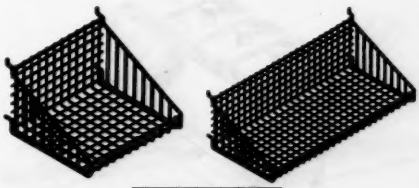
322,376
COMBINED TOOTHPASTE AND TOOTHBRUSH HOLDER
Kathleen Simpson, 3854 Linden Ave., Philadelphia, Pa. 19114
Filed Dec. 1, 1989, Ser. No. 444,632
Term of patent 14 years
U.S. Cl. D6—528



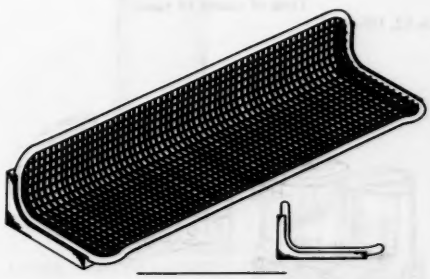
322,377
SOAP DISPENSER
Franklin D. Fender, 16717 Douglas Rd., Groveland, Fla. 34736
Filed Oct. 2, 1989, Ser. No. 415,537
Term of patent 14 years
U.S. Cl. D6—545



322,378
SHELF UNIT
Wayne C. Colman, 210 E. Water St., Troy, Ohio 45373
Filed Aug. 11, 1989, Ser. No. 392,392
Term of patent 14 years
U.S. Cl. D6—566

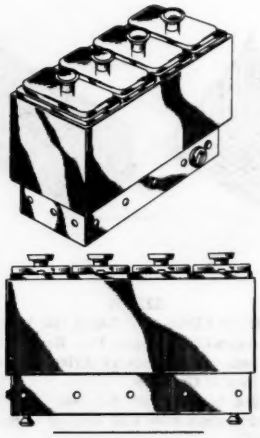


322,379
OVERHEAD LUGGAGE RACK OR THE LIKE
Heinz Wirth, Aalen-Oberalfingen, Fed. Rep. of Germany, assignor to Eisen- und Drahtwerk Erlau Aktiengesellschaft, Aalen, Fed. Rep. of Germany
Filed Aug. 24, 1989, Ser. No. 398,250
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1989, 8901480[U]
Term of patent 14 years
U.S. Cl. D6—566

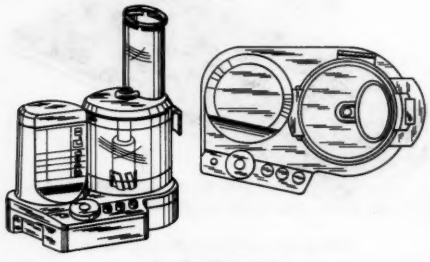


322,380
INFLATABLE NECK PILLOW
Rabei K. El-Asir, 12 Rozel Square, St. John's Gdns., Manchester, United Kingdom
Filed Feb. 13, 1987, Ser. No. 14,346
Term of patent 14 years
U.S. Cl. D6—604

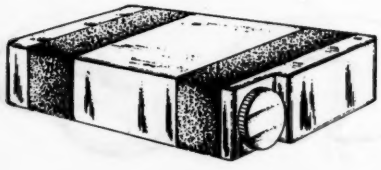
322,381
CANDY WARMER
James A. Frisbee, Hanover, Mass., assignor to Lorraine's Inc., Hanover, Mass.
Filed Feb. 16, 1989, Ser. No. 311,881
Term of patent 14 years
U.S. Cl. D7—357



322,382
FOOD PROCESSOR
Rudolf Maass, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany
Filed Jan. 11, 1989, Ser. No. 295,982
Term of patent 14 years
U.S. Cl. D7—384

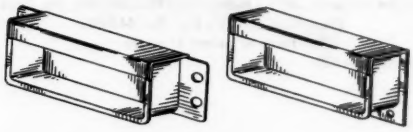


322,383
ICE PACK FOR A COOLER
Charles E. Jones, 911 Fuchsia St., Oxnard, Calif. 93030
Filed Jul. 20, 1989, Ser. No. 383,346
Term of patent 14 years
U.S. Cl. D7—605

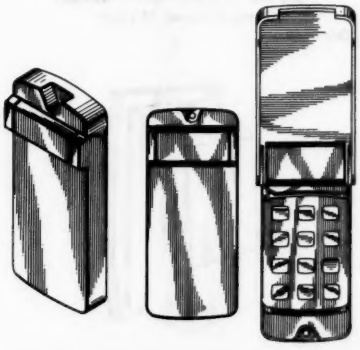


322,384
DRIVER FOR SCREWS OR THE LIKE
Albert Wan, Kowloon, Hong Kong, assignor to FEE TAT Plastic Factory Limited, Aberdeen, Hong Kong
Filed Jan. 30, 1989, Ser. No. 304,022
Claims priority, application United Kingdom, Aug. 12, 1988, 1052953
Term of patent 14 years
U.S. Cl. D8—68

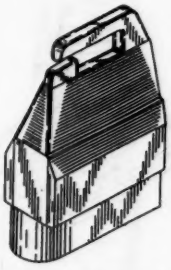
322,385
PULL FOR DRAWERS, DOORS OR THE LIKE
Ronald Simonton, Stonington, and Mark G. Stasko, Woodstock Valley, both of Conn., assignors to Herman Miller Inc., Zeeland, Mich.
Filed Jan. 8, 1990, Ser. No. 461,800
Term of patent 14 years
U.S. Cl. D8—313



322,386
KEYLESS LOCK
John F. Ginther, North Wales; Kim E. Burrichter, Upper Darby; Charles P. Coggins, Downingtown; David C. Guthrie, Chester Springs, and Mark K. Lucchi, West Chester, all of Pa., assignors to Allister Manufacturing Company, Inc., West Chester, Pa.
Filed Oct. 11, 1989, Ser. No. 419,632
Term of patent 14 years
U.S. Cl. D8—330

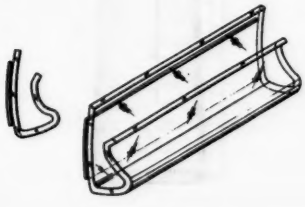


322,387
KEY FOR AN ELECTRIC LOCK
Henry C. Bailey, Denver, Colo., assignor to Electro Lock, Inc., Denver, Colo.
Filed Nov. 16, 1989, Ser. No. 438,154
Term of patent 14 years
U.S. Cl. D8—347

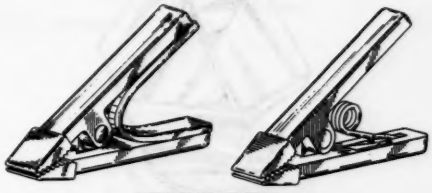


322,388
CLIP-HANGER FOR SUSPENDING ARTICLES FROM WALLS
Marlin J. Hoskinson, Philadelphia, Pa., and Eugene M. Lorincz, Cinnaminson, N.J., assignors to Moore Push-Pin Co., Wyndmoor, Pa.
Filed Apr. 24, 1989, Ser. No. 342,443
Term of patent 14 years
U.S. Cl. D8—370

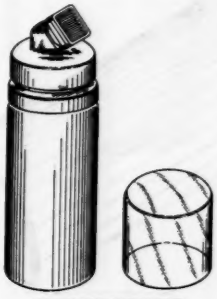
322,389
CLIP HOLDER FOR WIRE OR SIMILAR ARTICLE
Stanley Harmon, New York, N.Y., assignor to YSS, Inc., New York, N.Y.
Filed Jul. 6, 1989, Ser. No. 376,347
Term of patent 14 years
U.S. Cl. D8—380



322,390
SPRING CLAMP
Roderick L. Nimtz, Garrettsville, and Vincent B. Cetrone, Warren, both of Ohio, assignors to Warren Tool Corporation, Hiram, Ohio
Filed Jan. 29, 1990, Ser. No. 471,713
Term of patent 14 years
U.S. Cl. D8—395



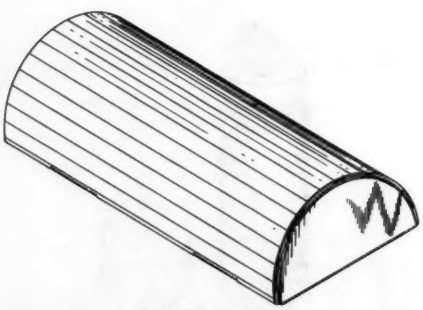
322,391
SPRAY DISPENSER
Bruno Morane, Neuilly sur Seine, France, assignor to Societe d'Hygiene Dermatologique de Vichy, France
Filed Sep. 13, 1988, Ser. No. 243,937
Claims priority, application Int'l Pat. Institute, Mar. 28, 1988, DM/010606
Term of patent 14 years
U.S. Cl. D9—300



322,392
COMBINED COLLAPSIBLE DISPENSER AND CAP
Bernard Schneider, Sainte Menehould, and Jean M. Mergui, Paris, both of France, assignors to CEBAL, a French societe anonyme, Clichy, France
Filed Apr. 28, 1989, Ser. No. 344,845
Claims priority, application World Int. Prop. O., Oct. 28, 1988, DM/012 063
Term of patent 14 years
U.S. Cl. D9—300

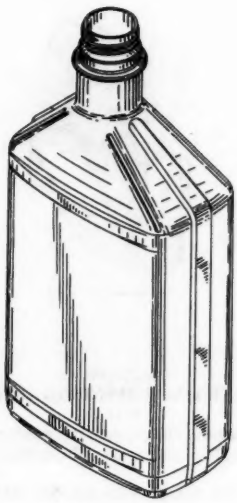
322,393
COMPARTMENTED CONTAINER
Ernest M. Porter, 64 Oxford Street, Toronto, Ontario, M5T 1P1, Canada
Filed Dec. 18, 1989, Ser. No. 438,880
Term of patent 14 years
U.S. Cl. D9—341

322,394
RETAIL PACKAGE
Peira Grandesso, New York, N.Y., assignor to Liz Claiborne, Inc., New York, N.Y.
Filed Nov. 3, 1989, Ser. No. 432,182
Term of patent 14 years
U.S. Cl. D9—346



322,395
COMBINED DEODORANT DISPENSER BOTTLE AND CAP OR SIMILAR ARTICLE
Ingrid Sommer, Hamburg, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany
Filed Dec. 27, 1989, Ser. No. 459,104
Claims priority, application Fed. Rep. of Germany, Jun. 28, 1989, 013926
Term of patent 14 years
U.S. Cl. D9—367

322,396
BOTTLE
Donald D. Cochran, Bartlett, Ill., assignor to American National Can Company, Chicago, Ill.
Filed Jan. 23, 1989, Ser. No. 300,415
Term of patent 14 years
U.S. Cl. D9—375



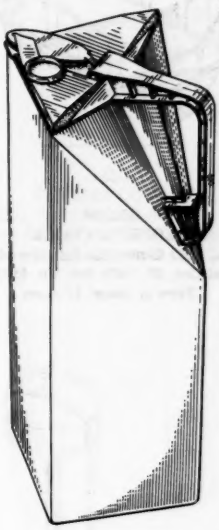
322,397
BOTTLE
Earl Hoyt, Franklin Lakes, N.J., assignor to Reckitt & Colman Inc., Wayne, N.J.
Filed Jan. 26, 1990, Ser. No. 471,245
Term of patent 14 years
U.S. Cl. D9—375

322,398
COMBINED BOTTLE AND CAP
Edward C. Plunkett, New York, N.Y., assignor to Parfums Christine Darvin, Paris, France
Filed May 23, 1988, Ser. No. 197,396
Term of patent 14 years
U.S. Cl. D9—377

322,399
COMBINED FRAGRANCE BOTTLE AND STOPPER
Florence D. Cromer, 22 Barclays Dr., Sag Harbor, N.Y. 11963
Filed Mar. 23, 1990, Ser. No. 498,924
Term of patent 14 years
U.S. Cl. D9—384

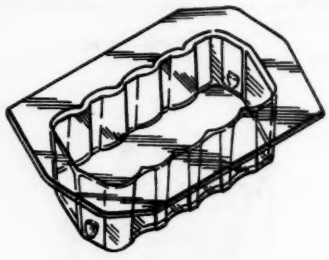
322,400
PACKAGE FOR MEDICATION
Eric Sorensen, 707 W. Mountain Rd., Sparta, N.J. 07871
Filed Oct. 5, 1989, Ser. No. 417,669
Term of patent 14 years
U.S. Cl. D9—415

322,401
PACKAGING CONTAINER
Per Nylander, Styckjunkargatan, Sweden, assignor to Roby Teknik AB, Lund, Sweden
Division of Ser. No. 143,614, Jan. 13, 1988, Pat. No. D. 317,260.
This application Nov. 26, 1990, Ser. No. 618,100
Claims priority, application Sweden, Jul. 13, 1987, 871584; Jul. 13, 1987, 871585; Jul. 13, 1987, 871586; Jul. 13, 1987, 871587; Jul. 13, 1987, 871588; Jul. 13, 1987, 871589; Jul. 13, 1987, 871590; Jul. 13, 1987, 871591; Jul. 13, 1987, 871592; Jul. 13, 1987, 871593
Term of patent 14 years
U.S. Cl. D9—417

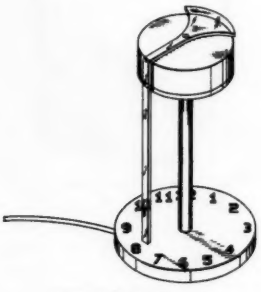


322,402
CONTAINER
Dennis J. Budzbanowski, R.D. #5, Box 232 Nancy Dr., Meadville, Pa. 16335
Filed May 30, 1989, Ser. No. 358,200
Term of patent 14 years
U.S. Cl. D9—428

322,403
MEDICINE CONTAINER
Rolland Eaton, Dayton, Ohio, assignor to Eaton Forms Corporation, Dayton, Ohio
Filed Nov. 29, 1989, Ser. No. 442,682
Term of patent 14 years
U.S. Cl. D9—429



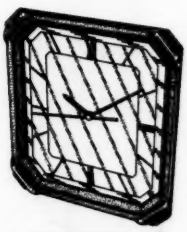
322,404
PEDESTAL CLOCK
E. Lakin Phillips, 2733 Centerville Rd., Herndon, Va. 22071
Filed Dec. 29, 1989, Ser. No. 458,831
Term of patent 14 years
U.S. Cl. D10—1



322,405
COMBINED CLOCK AND CALCULATOR
Juhei Ozawa, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan
Filed Apr. 17, 1989, Ser. No. 339,366
Claims priority, application Japan, Oct. 17, 1988, 63-40722D
Term of patent 14 years
U.S. Cl. D10—2

322,406
CLOCK
Keiko Nomura, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Apr. 7, 1989, Ser. No. 335,200
Term of patent 14 years
U.S. Cl. D10—6

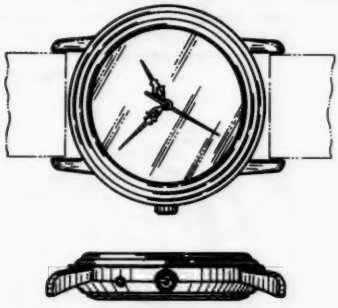
322,407
CLOCK
Masahiro Aikawa, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Jun. 5, 1989, Ser. No. 361,091
Claims priority, application Japan, Feb. 17, 1989, 1-5848
Term of patent 14 years
U.S. Cl. D10—24



322,408
CLOCK
Seiji Odaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Apr. 24, 1989, Ser. No. 342,392
Claims priority, application Japan, Nov. 28, 1988, 63-46348
Term of patent 14 years
U.S. Cl. D10—26

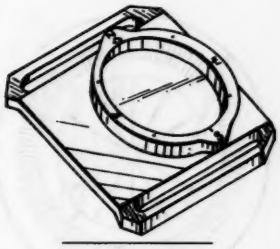
322,409
CLOCK
Hisako Sugano, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Aug. 29, 1989, Ser. No. 400,041
Term of patent 14 years
U.S. Cl. D10—26

322,410
WRISTWATCH
Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114
Filed Nov. 21, 1988, Ser. No. 273,510
Term of patent 14 years
U.S. Cl. D10—39

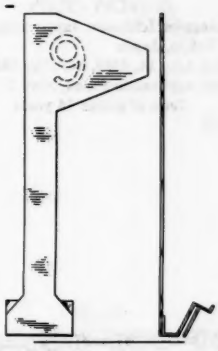


322,411
WRIST-WATCH
Ernest Schneider, Chemin de la Baune, Switzerland, assignor to Breitling Montres S.A., Switzerland
Filed Apr. 10, 1989, Ser. No. 335,987
Claims priority, application Switzerland, Oct. 11, 1988, 117034
Term of patent 14 years
U.S. Cl. D10—39

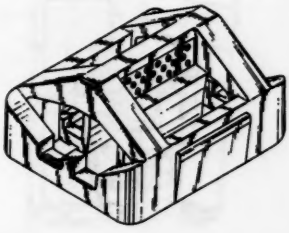
322,412
STRAP COMPASS CASE
Gregory L. Cross, and Wendell C. Cross, both of Arvada, Colo., assignors to Sun Company, Inc., Arvada, Colo.
Filed Aug. 11, 1989, Ser. No. 393,308
Term of patent 14 years
U.S. Cl. D10—68



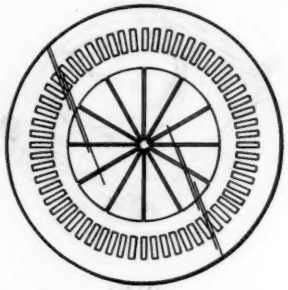
322,413
VEHICLE LOCATOR
Vincent S. Castillo, 2217 Telegraph Ave., Stockton, Calif. 95204
Filed Mar. 29, 1990, Ser. No. 502,013
Term of patent 14 years
U.S. Cl. D10—110



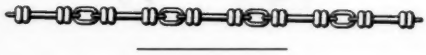
322,414
REFLECTIVE ROAD STUD
Carl Scratcher, St. Annes on Sea, England, assignor to Glasdon UK Limited, England
Filed Aug. 21, 1989, Ser. No. 396,607
Claims priority, application United Kingdom, Feb. 21, 1989, 1057317
Term of patent 14 years
U.S. Cl. D10—113



322,415
TIMPIECE FACE
Douglas E. Ritchie, Stow, Mass., assignor to By Design Corp., Cambridge, Mass.
Filed Mar. 6, 1989, Ser. No. 318,941
Term of patent 14 years
U.S. Cl. D10—126

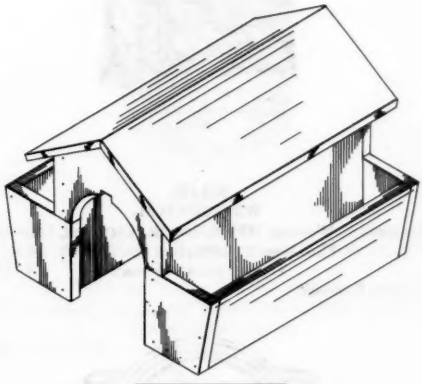


322,416
JEWELRY CHAIN
Shigesaburo Nakagawa, Ichikawa, Japan, assignor to Nakagawa Corporation, Tokyo, Japan
Filed Aug. 14, 1989, Ser. No. 393,510
Claims priority, application Japan, May 2, 1989, 116437
Term of patent 14 years
U.S. Cl. D11—13

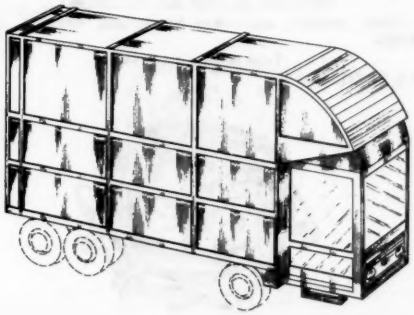


322,417
GEM SETTING
Zuri Mesica, Sherman Oaks, Calif., assignor to Prestige Collection, Inc., Los Angeles, Calif.
Filed May 16, 1989, Ser. No. 352,456
Term of patent 14 years
U.S. Cl. D11—36

322,418
COMBINED PLANTER AND MAILBOX COVER
Mark D. White, #50 Greenwood, Fayetteville, Ark. 72701
Filed Jul. 24, 1989, Ser. No. 383,886
Term of patent 14 years
U.S. Cl. D11—144

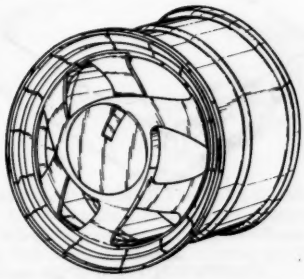


322,419
UTILITY/DUMP TRUCK BODY
Edward J. Camillieri, 8661 Blythe Ave., Orangevale, Calif. 95662, assignor to Edward J. Camillieri, Orangeville, Calif.
Filed Feb. 25, 1988, Ser. No. 160,092
Term of patent 14 years
U.S. Cl. D12—15

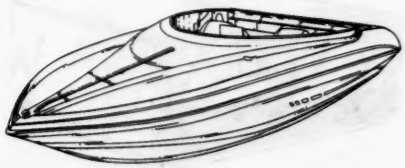


322,420
CARRIAGE FOR A CHILD
Peter C. Hawkes, Rugby, England, assignor to Hestair Maclaren Limited, Long Buckby, United Kingdom
Filed Jul. 28, 1989, Ser. No. 390,691
Claims priority, application United Kingdom, Jan. 30, 1989, 1058541
Term of patent 14 years
U.S. Cl. D12—129

322,421
WHEEL
Lawrence K. Shinoda, West Bloomfield, Mich., assignor to Shinoda Design Associates, Inc., Livonia, Mich.
Filed Aug. 17, 1990, Ser. No. 568,695
Term of patent 14 years
U.S. Cl. D12—209

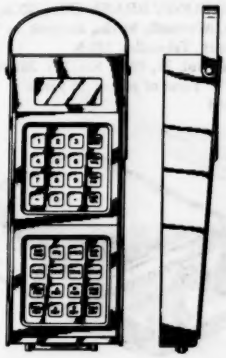


322,422
SPEED BOAT
Arthur E. Carlson, Cypres, Calif., assignor to Glastron, Inc., New Braunfels, Tex.
Filed Jun. 7, 1989, Ser. No. 362,831
Term of patent 14 years
U.S. Cl. D12—300

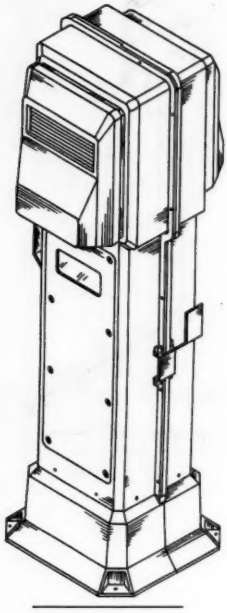


322,423
OUTBOARD MOTOR CARRIER
Philip J. Greenberg, 20622 Superior St., Unit 6, Chatsworth, Calif. 91311
Filed Mar. 19, 1990, Ser. No. 495,214
Term of patent 14 years
U.S. Cl. D12—317

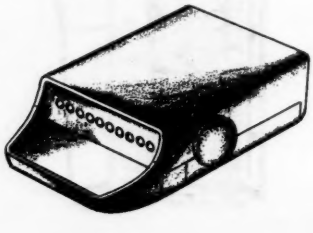
322,424
CONTROL UNIT FOR MOTION CONTROL SYSTEM
John M. Higbie, 812 S. Glendale Ave., No. 26, Glendale, Calif. 91205
Filed Apr. 14, 1989, Ser. No. 337,545
Term of patent 14 years
U.S. Cl. D13—168



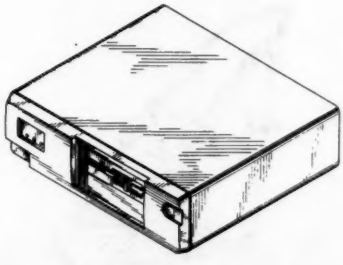
322,425
COMBINED MARINA POWER PEDESTAL AND LAMP ENCLOSURE
Dale J. Simonson, Mankato, Donald H. Stoll, North Mankato, Ronald J. Orchard, Mankato, all of Minn.
Filed Sep. 20, 1989, Ser. No. 410,676
Term of patent 14 years
U.S. Cl. D13—152



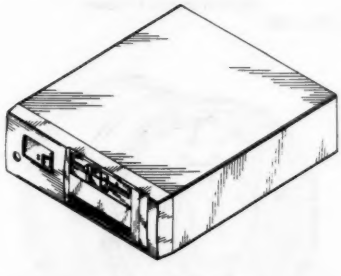
322,426
ELECTRONIC BRAKE CONTROLLER
Barry G. Austin, Marshall, Mich., assignor to Tekonsha Engineering Company, Tekonsha, Mich.
Filed Jul. 31, 1989, Ser. No. 386,684
Term of patent 14 years
U.S. Cl. D13—164



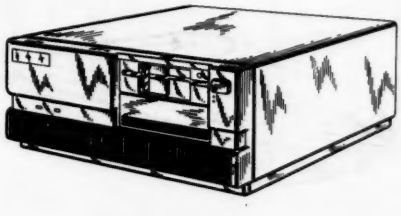
322,427
ARITHMETRIC CONTROL UNIT FOR AN ELECTRONIC COMPUTER
Taneaki Chiba, and Kimio Nobeashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Nov. 20, 1989, Ser. No. 438,367
Claims priority, application Japan, May 31, 1989, 1-20172
Term of patent 14 years
U.S. Cl. D14—100



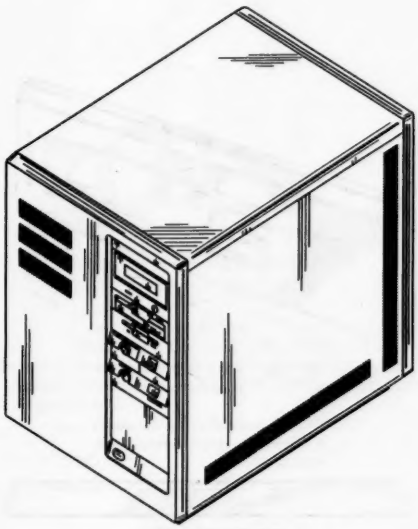
322,428
ARITHMETIC CONTROL UNIT FOR AN ELECTRONIC COMPUTER
Yasuharu Sato, and Kimio Nobeashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Dec. 11, 1989, Ser. No. 449,258
Term of patent 14 years
U.S. Cl. D14—100



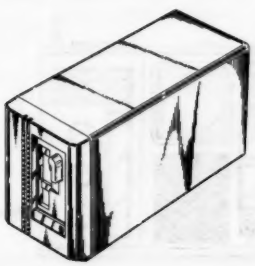
322,429
ELECTRONIC COMPUTER
Mitsuo Tanaka, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan
Continuation-in-part of Ser. No. 450,868, Dec. 13, 1989. This application Jan. 2, 1990, Ser. No. 460,222
Claims priority, application Japan, Jun. 14, 1989, 1-21977; Jul. 5, 1989, 1-24887
Term of patent 14 years
U.S. Cl. D14—100



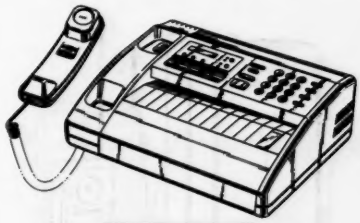
322,430
COMPUTER COVER
Jeffrey L. Kline; Tristan A. Merino, both of Austin, and Edward J. Sabella, Georgetown, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jan. 29, 1990, Ser. No. 472,683
Term of patent 14 years
U.S. Cl. D14—102



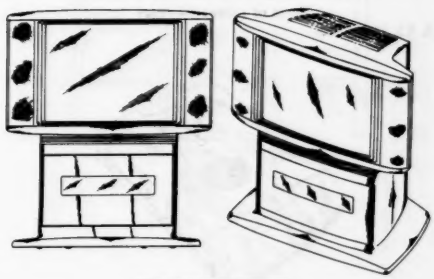
322,431
STREAMING CASSETTE TAPE DRIVE
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Minoru Sube, Hachioji; Katsuhiro Takashima, Yokohama, and Keiji Tsunoda, Kokubunji, all of Japan, assignors to TEAC Corporation, Japan
Filed Dec. 7, 1989, Ser. No. 447,251
Claims priority, application Japan, Jun. 14, 1989, 1-21984
Term of patent 14 years
U.S. Cl. D14—108



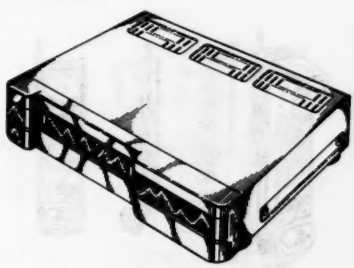
322,432
FACSIMILE MACHINE
Eiji Nakajima, Tokyo, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Feb. 22, 1990, Ser. No. 483,539
Claims priority, application Japan, Aug. 31, 1989, 1-31734
Term of patent 14 years
U.S. Cl. D14—118



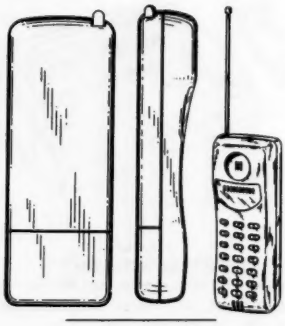
322,433
TELEVISION RECEIVER
Thomas E. Renk, Jr., Indianapolis, and William R. Abraham, Greenwood, both of Ind., assignors to Thomson Consumer Electronics, Inc., Indianapolis, Ind.
Filed Jan. 29, 1990, Ser. No. 471,725
Term of patent 14 years
U.S. Cl. D14—133



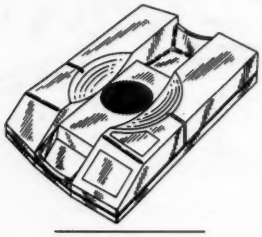
322,434
VIDEO CASSETTE RECORDER
Richard K. Althans, Long Grove, and Francis J. Greb, Deerfield, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.
Filed Mar. 19, 1990, Ser. No. 495,542
Term of patent 14 years
U.S. Cl. D14—135



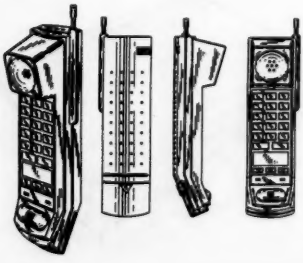
322,435
PORTABLE CORDLESS HANDSET TELEPHONE
Tsuyoshi Nakamachi; Takato Abe; Masahito Tsuchiya, all of Kanagawa, and Atsushi Musha, Hyogo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 19, 1990, Ser. No. 467,576
Claims priority, application Japan, Jul. 27, 1989, 1-28052
Term of patent 14 years
U.S. Cl. D14—138



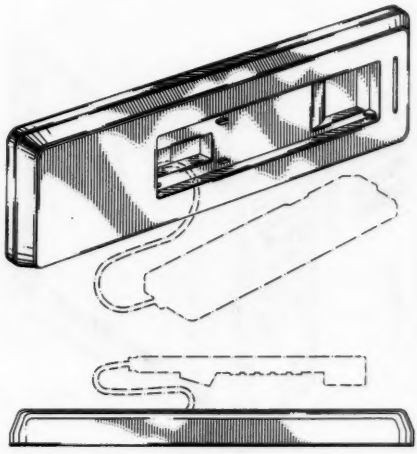
322,436
BASE FOR A TELEPHONE SET
Maki Myoga, Portland, Oreg., assignor to Code-A-Phone Corporation, Clackamas, Oreg.
Filed Jan. 8, 1991, Ser. No. 638,648
Term of patent 14 years
U.S. Cl. D14—138



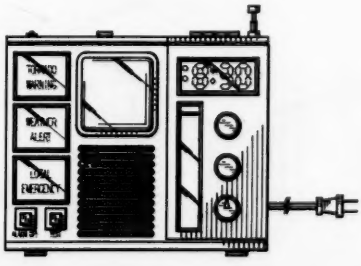
322,437
HANDSET FOR A TELEPHONE BASE
Maki Myoga, Portland, Oreg., assignor to Code-A-Phone Corporation, Clackamas, Oreg.
Filed Jan. 8, 1991, Ser. No. 638,650
Term of patent 14 years
U.S. Cl. D14—138



322,438
TELEPHONE HANDSET DISPENSER
Richard E. Skowronski, Elk Grove Village, Ill., assignor to GTE Airfone Incorporated, Oakbrook, Ill.
Filed Nov. 28, 1990, Ser. No. 624,901
Term of patent 14 years
U.S. Cl. D14—151

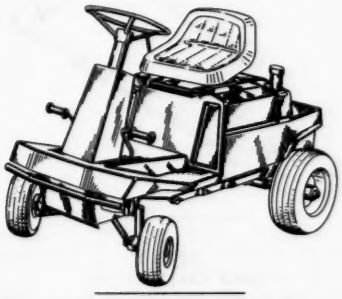


322,439
COMBINED RADIO FREQUENCY RECEIVER AND ALARM
Curtis A. Wilson, 3803 E. Texas St., Lot 12, Bossier City, La. 71111, and Donald J. Dooley, Jr., 726 Cindy La., Haughton, La. 71037
Filed Apr. 17, 1989, Ser. No. 338,770
Term of patent 14 years
U.S. Cl. D14—168

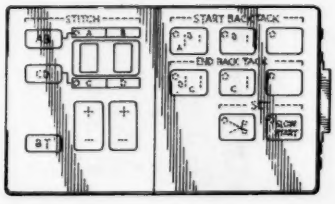


322,440
MICROPHONE
Richard M. Urella, Princeton, Mass., assignor to David Clark Company Inc., Worcester, Mass.
Filed Feb. 21, 1989, Ser. No. 312,579
Term of patent 14 years
U.S. Cl. D14—225

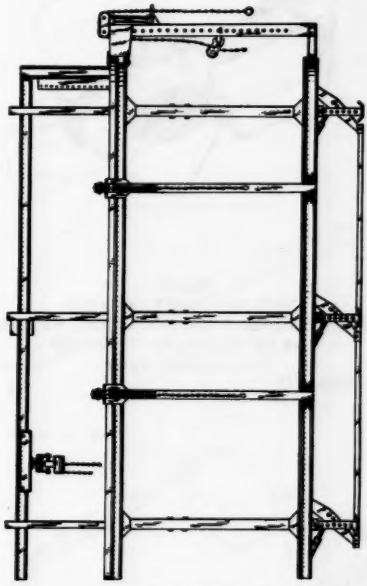
322,441
RIDING LAWN MOWER TRACTOR
Darrell W. Hinklin, Excelsior, and Donald M. White, III, Chanhassen, both of Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed Jul. 14, 1989, Ser. No. 380,222
Term of patent 14 years
U.S. Cl. D15—15



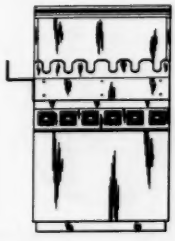
322,442
CONTROLLER FOR A SEWING MACHINE
Hiroshi Kumatani; Satomi Yamauchi, both of Nagoya, and Takanobu Fujimoto, Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 14, 1989, Ser. No. 436,535
Claims priority, application Japan, May 15, 1989, 1-17592
Term of patent 14 years
U.S. Cl. D15—72



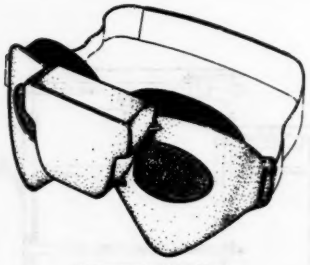
322,443
DEVICE FOR REPAIRING AND STRENGTHENING VEHICLES
Carl R. Field, Ankeny, Iowa, assignor to Duz-Mor, Inc., Des Moines, Iowa
Filed Nov. 21, 1988, Ser. No. 273,872
Term of patent 14 years
U.S. Cl. D15—122



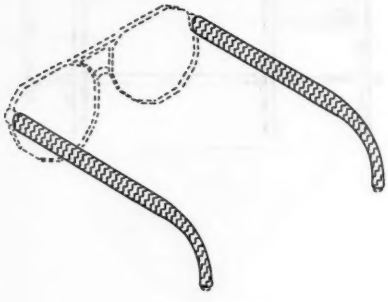
322,444
LUBRICATOR AND VACUUM UNIT CONSOLE
Robert F. Shea, Florissant, Mo., assignor to McNeil (Ohio) Corporation, St. Paul, Minn.
Filed Aug. 22, 1988, Ser. No. 234,846
Term of patent 14 years
U.S. Cl. D15—150



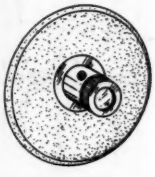
322,445
EYE-MASSAGING DEVICE
Shan-Hsiung Lee, 1st Floor, No. 27 Alley 5, Lane 351, Tunhwa S. Rd., Taipei, Taiwan
Filed Oct. 26, 1988, Ser. No. 263,482
Term of patent 14 years
U.S. Cl. D16—100



322,446
EYEGLASS TEMPLE COVERS
Robert E. Bell, Jr., Rte. 5, Box 1260, Hickory, N.C. 28601
Filed Jun. 12, 1989, Ser. No. 368,229
Term of patent 14 years
U.S. Cl. D16—123

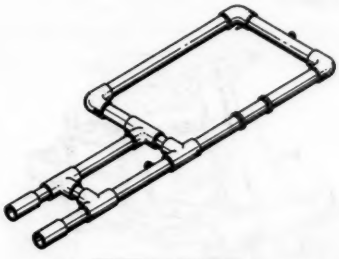


322,447
COMBINED TELESCOPE AND MOUNTING RING FOR HANDICAPPED PATIENTS
Richard E. Feinbloom, New York, N.Y., assignor to Designs for Vision, Inc., Ronkonkoma, N.Y.
Filed Mar. 6, 1989, Ser. No. 319,469
Term of patent 14 years
U.S. Cl. D16—132

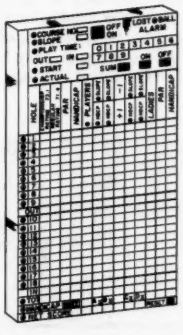


322,448
COMBINED VIDEO CAMERA AND VIDEO TAPE RECORDER
Yuji Kondo, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 17, 1989, Ser. No. 422,449
Claims priority, application Japan, Apr. 19, 1989, 1-14445
Term of patent 14 years
U.S. Cl. D16—202

322,449
FRAME FOR AN ELECTRONIC INSTRUMENT
Robert V. Hunt, 4875 Broadway, Gary, Ind. 46409
Filed Dec. 5, 1988, Ser. No. 280,299
Term of patent 14 years
U.S. Cl. D17—20



322,450
GOLF CALCULATOR
William F. Smith, Sr., 1681 Wesleyan Ave., Dayton, Ohio 45406
Filed Feb. 24, 1989, Ser. No. 315,695
Term of patent 14 years
U.S. Cl. D18—6



322,451

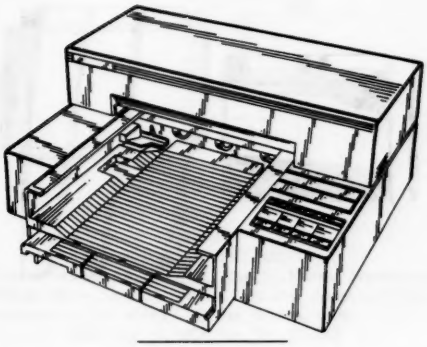
INK-JET PRINTER

Donald R. McClelland, Brush Prairie; Donald R. Bloyer, and Richard E. Berriman, both of Vancouver, all of Wash., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 3, 1987, Ser. No. 117,101

Term of patent 14 years

U.S. Cl. D18—55



322,452

CABINET FOR AN INKJETPRINTER

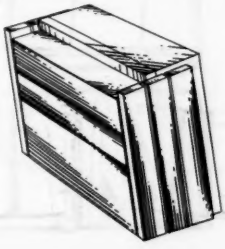
Wolfram J. P. Peters, Leiden, Netherlands, assignor to Stork X-Cel B.V., Boxmeer, Netherlands

Filed Aug. 8, 1988, Ser. No. 229,481

Claims priority, application Int'l Pat. Institute, Mar. 17, 1988, DM/010532

Term of patent 14 years

U.S. Cl. D18—59



322,453

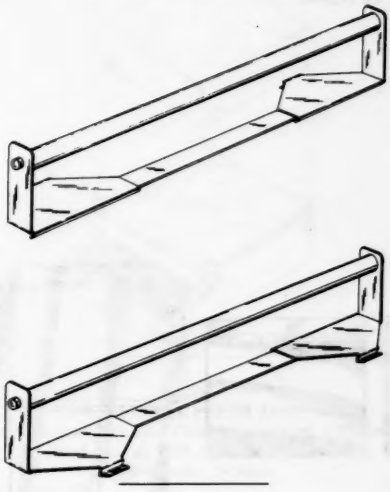
PAPER ROLL HOLDER FOR A PRINTER

Göran I. Holmberg, Boca Raton, Fla., assignor to Basics Corporation, Boca Raton, Fla.

Filed Mar. 9, 1989, Ser. No. 321,437

Term of patent 14 years

U.S. Cl. D18—56



322,454

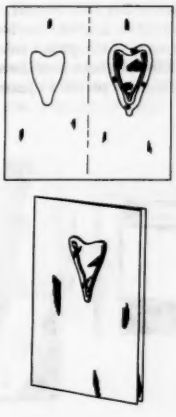
GREETING CARD

Donald E. LeBlanc, 185 Clover Place, Kitchener, Ontario, Canada N2A 1P3

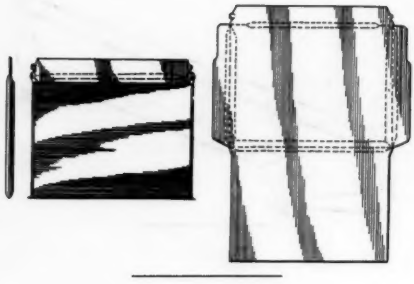
Filed Nov. 2, 1989, Ser. No. 430,477

Term of patent 14 years

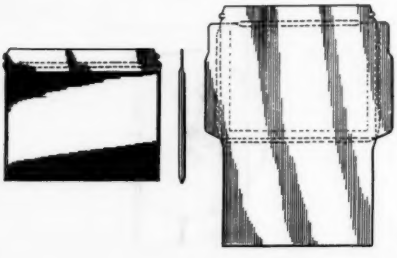
U.S. Cl. D19—1



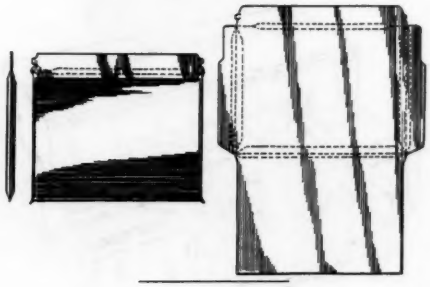
322,455
ENVELOPE
Hampton E. Forbes, Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 760,603, Jul. 30, 1985, abandoned. This application Mar. 2, 1988, Ser. No. 166,790
The portion of the term of this patent subsequent to Dec. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—3



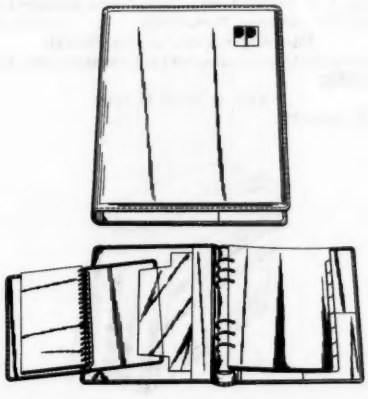
322,456
ENVELOPE
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 760,601, Jul. 30, 1985. This application Mar. 2, 1988, Ser. No. 166,791
The portion of the term of this patent subsequent to Dec. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—3



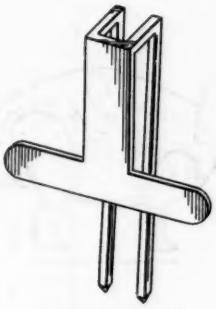
322,457
ENVELOPE
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 760,583, Jul. 30, 1985, abandoned. This application Mar. 2, 1988, Ser. No. 166,811
The portion of the term of this patent subsequent to Dec. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—3



322,458
COMBINED NOTEBOOK AND CALENDAR INSERT THEREFOR
Olle Wiberg, Storvreta, Sweden, assignor to Esselte Diaries, Solna, Sweden
Filed Jul. 17, 1989, Ser. No. 380,263
Claims priority, application Sweden, Feb. 1, 1989, 89 0262
Term of patent 14 years
U.S. Cl. D19—27

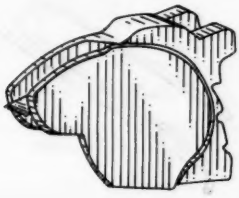


322,459
BOOK CLIP
Arturo Pimienta, The Woodlands, Tex., assignor to Universal Network, Inc., The Woodlands, Tex.
Filed Mar. 14, 1990, Ser. No. 493,382
Term of patent 14 years
U.S. Cl. D19—34

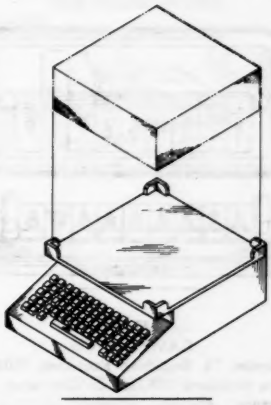


322,460
WRITING INSTRUMENT
Walter B. Herbst, Evanston, Ill.; Paul D. Hurley, Huntington Woods, Mich., and Norman D. Poisson, Andover, Mass., assignors to The Gillette Company, Boston, Mass.
Filed Aug. 14, 1989, Ser. No. 393,924
Term of patent 14 years
U.S. Cl. D19—50

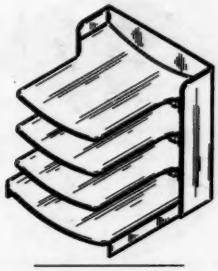
322,461
TAPE DISPENSER
Dave Alexander, 960 Saint John's Pl., Brooklyn, N.Y. 11213
Filed May 9, 1989, Ser. No. 349,065
Term of patent 14 years
U.S. Cl. D19—69



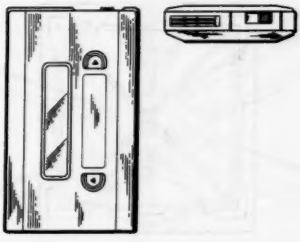
322,462
NOTE PAD HOLDER
Alexander Wehrle, 435-15 Brook Ave., Deer Park, N.Y. 11729
Filed Sep. 14, 1988, Ser. No. 244,246
Term of patent 14 years
U.S. Cl. D19—92



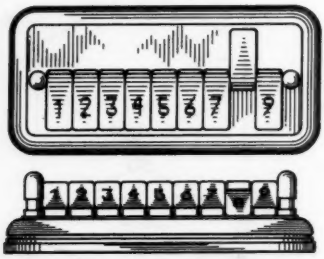
322,463
MULTI-LEVEL PAPER TRAY
Robert S. Hansen, P.O. Box 2238, Rohnert Park, Calif. 94928
Filed Aug. 23, 1989, Ser. No. 397,568
Term of patent 14 years
U.S. Cl. D19—92



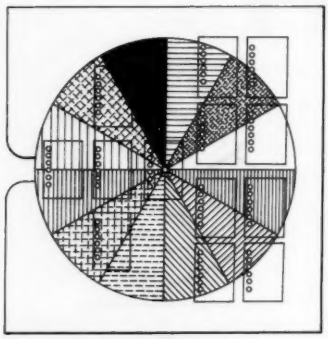
322,464
SELECTIVE CALL RECEIVER OR SIMILAR ARTICLE
William J. Scheid, Coral Springs; Joseph E. Laviana, Lake Worth, and Thomas J. Rollins, Boca Raton, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Aug. 20, 1990, Ser. No. 569,664
Term of patent 14 years
U.S. Cl. D14—191



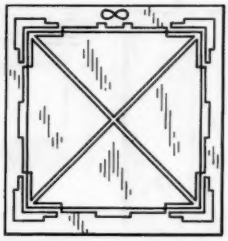
322,465
GAME
Wilfried Beck, 4-3962 S.I.L. Hwy., Campbell River, B.C., Canada V9W-5T7
Filed May 26, 1989, Ser. No. 357,489
Term of patent 14 years
U.S. Cl. D21—14



322,466
GAME BOARD
Chaloum Benaim, 74, Boulevard Exelmans, 75016 Paris, and Jean-Pierre Rebillard, 106, rue de Charenton, 75012 Paris, both of France
Filed Jun. 24, 1988, Ser. No. 210,773
Claims priority, application France, Dec. 24, 1987, 87 7761
Term of patent 14 years
U.S. Cl. D21—20



322,467
GAME BOARD
Tuan V. Huynh, 1710 San Antonio, Alameda, Calif. 94501
Filed Jul. 7, 1988, Ser. No. 216,242
Term of patent 14 years
U.S. Cl. D21—34

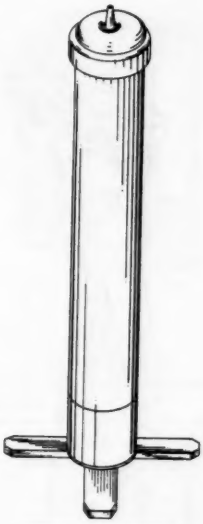


322,468
TOY FIGURE
Frederick W. Kruger, Churchville, Pa., and Leo S. Volpe, Collingswood, N.J., assignors to Tyco Industries, Inc., Mt. Laurel, N.J.
Filed Jul. 25, 1989, Ser. No. 384,960
Term of patent 14 years
U.S. Cl. D21—148

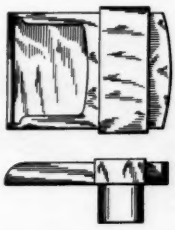
322,469
CHILD'S STUFFED BEAR
Judith M. Berger, and Michael R. Berger, both of 1218 Pintail Cir., Boulder, Colo. 80303
Filed Aug. 29, 1988, Ser. No. 194,554
Term of patent 14 years
U.S. Cl. D21—159

322,470
WINE SIPHON
John D. Garlich, 525 22nd St., Boulder, Colo. 80302
Filed Jun. 28, 1988, Ser. No. 213,974
Term of patent 14 years
U.S. Cl. D23—200

322,471
BALLOON PUMP OR SIMILAR ARTICLE
Thomas M. Myers, 1509 Parker Bend, Austin, Tex. 78734
Filed Oct. 19, 1989, Ser. No. 424,147
Term of patent 14 years
U.S. Cl. D23—231

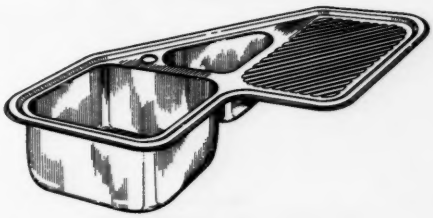


322,472
SPOUT
Herbert V. Kohler, Jr., Kohler; Alan D. Bengtson, Sheboygan; Thomas E. Gaffney, Sheboygan, and Mary J. Reid, Sheboygan, all of Wis., assignors to Kohler Co., Kohler, Wis.
Continuation-in-part of Ser. No. 130,842, Dec. 9, 1987, Pat. No. Des. 312,681, and a continuation-in-part of Ser. No. 288,043, Dec. 20, 1988, Pat. No. Des. 319,685. This application Jan. 19, 1989, Ser. No. 299,841
The portion of the term of this patent subsequent to Dec. 4, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—255

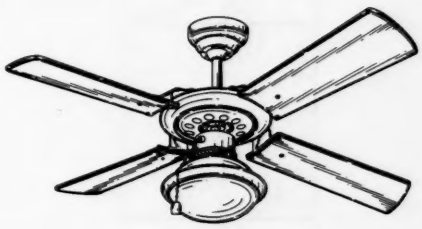


322,473
COMBINED LAVATORY AND TABLE TOP
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Division of Ser. No. 45,254, May 1, 1987, Pat. No. Des. 319,497, which is a continuation-in-part of Ser. No. 3,214, Jan. 14, 1987, abandoned. This application Feb. 13, 1991, Ser. No. 657,212
Term of patent 14 years
U.S. Cl. D23—284

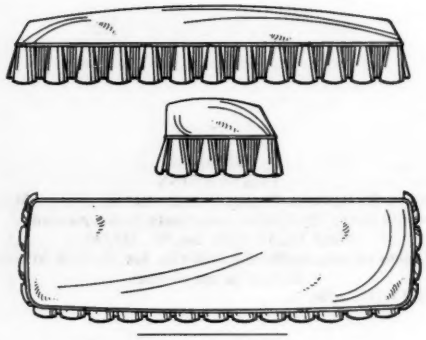
322,474
CORNER SINK
Stephen B. Dawkins, Penhurst, Australia, assignor to McIlwraith Davey Pty Limited, New South Wales, Australia
Filed Jul. 12, 1988, Ser. No. 218,593
Claims priority, application Australia, Jan. 15, 1988, 0153/88
Term of patent 14 years
U.S. Cl. D23—288



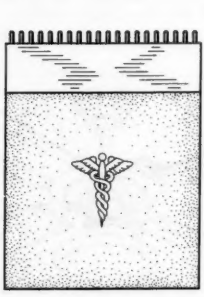
322,475
COMBINED ELECTRIC CEILING FAN AND LIGHT
Herbert W. Markwardt, and Michael A. Markwardt, both of Fort Worth, Tex., assignors to Encon Industries, Inc., Fort Worth, Tex.
Filed Sep. 18, 1990, Ser. No. 584,991
The portion of the term of this patent subsequent to Nov. 26, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—377



322,476
FIREPLACE HEARTH COVER
Lisa A. Lytle, 8159 S. 8th, Kalamazoo, Mich. 49009
Filed May 23, 1989, Ser. No. 355,372
Term of patent 14 years
U.S. Cl. D23—403

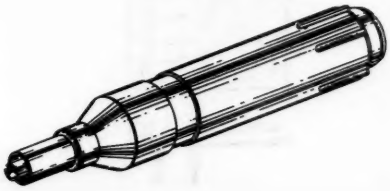


322,477
COMBINED SPONGE GAUZE BANDAGE AND HOOK ENGAGING UNIT
Ramon V. Bernal, P.O. Box 843, Nogales, Ariz. 85628
Filed Nov. 21, 1988, Ser. No. 274,130
Term of patent 14 years
U.S. Cl. D24—124

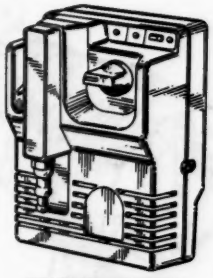


322,478
SURGICAL PURSE STRING APPLICATOR
David T. Green, Westport; Henry Bolanos, E. Norwalk, both of Conn.; Wayne P. Young, Brewster, N.Y., and Stephen Gerry, Newtown, Conn., assignors to United States Surgical Corporation, Norwalk, Conn.
Filed May 25, 1989, Ser. No. 357,105
Term of patent 14 years
U.S. Cl. D24—145

322,479
HOLDER FOR LANCET
Katsuhiko Miyaguchi, Yamanashi, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 30, 1989, Ser. No. 444,091
Claims priority, application Japan, Jun. 2, 1989, 1-20056
Term of patent 14 years
U.S. Cl. D24—147

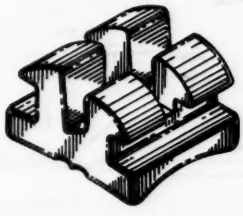


322,480
OXYGEN SUPPLY DOSER
William J. Rotariu, Port St. Lucie, Fla., assignor to Pulsair Anstalt, Vaduz, Liechtenstein
Filed May 18, 1989, Ser. No. 353,468
Term of patent 14 years
U.S. Cl. D24—164

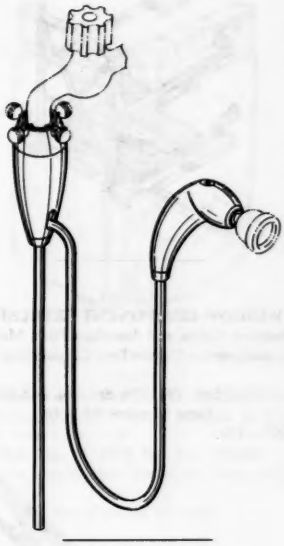


322,481
HEARING AID
Okke O. van Mourik, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 27, 1989, Ser. No. 441,922
Claims priority, application Benelux, Jun. 27, 1989, 64479-03
Term of patent 14 years
U.S. Cl. D24—174

322,482
ORTHODONTIC BRACKET
John Ianieri, Cinnaminson, N.J., and Shannon Rogers, Auburn, Calif., assignors to Auradonics, Inc., Cinnaminson, N.J.
Filed Sep. 14, 1989, Ser. No. 407,029
Term of patent 14 years
U.S. Cl. D24—180

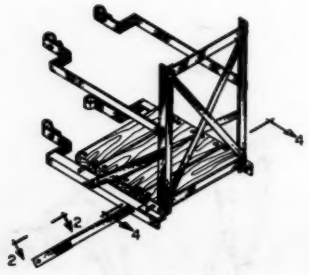


322,483
VACUUM SKIN CLEANER
Shunichi Kishimoto, 1-8-605, Kasuga 4-chome, Suita-shi, Osaka, Japan
Filed Jun. 20, 1989, Ser. No. 369,089
Term of patent 14 years
U.S. Cl. D24—200



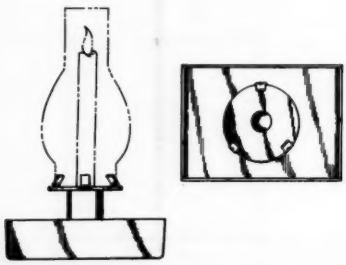
322,484
ENDOMETRIAL CELL SAMPLER
Hirobumi Sakita, Tokyo, Japan, assignor to Anne Co., Ltd., Isehara, Japan
Filed Mar. 10, 1989, Ser. No. 322,054
Term of patent 14 years
U.S. Cl. D24—216

322,485
LADDER PLATFORM
David F. Leeland, 309 Knights Bridge Way, Lititz, Pa. 17543
Filed May 2, 1989, Ser. No. 346,615
Term of patent 14 years
U.S. Cl. D25—68

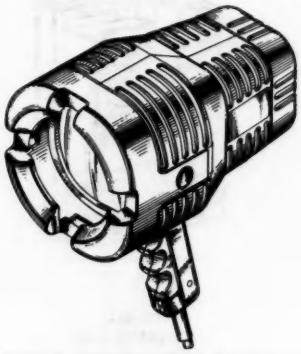


322,486
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 19, 1988, Ser. No. 246,186
Term of patent 14 years
U.S. Cl. D25—122

322,487
COMBINED CANDLESTICK AND PLANT HOLDER
Roger A. Kazanowski, 30425 W. Eight Mile, Livonia, Mich. 48152
Filed Jun. 19, 1989, Ser. No. 368,226
Term of patent 14 years
U.S. Cl. D26—10

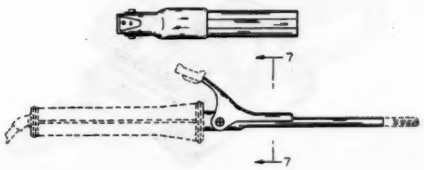


322,488
HIGH INTENSITY LAMP HOUSING
James R. Lindsay, Brea; Ronald A. Meyer, San Dimas; Alexander Garcia, Jr., Upland, and Alexander Waluszko, Pasadena, all of Calif., assignors to UVP, Inc., San Gabriel, Calif.
Filed Aug. 28, 1989, Ser. No. 399,756
Term of patent 14 years
U.S. Cl. D26—45



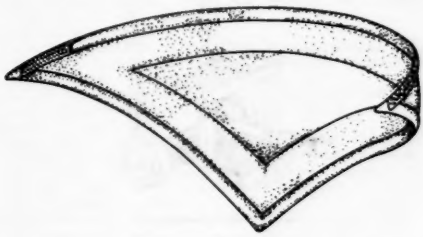
322,489
DECORATIVE GAS PLASMA LIGHT DISPLAY
William P. Parker, Box 909, Rte. 100, Waitsfield, Vt. 05673
Filed May 19, 1989, Ser. No. 354,974
Term of patent 14 years
U.S. Cl. D26—104

322,490
CURLING IRON BARREL
Nicolo Altamore, Rockford, and Gregory S. Wahl, Sterling, both of Ill., assignors to Wahl Clipper Corporation, Sterling, Ill.
Continuation-in-part of Ser. No. 80,699, Aug. 3, 1987, abandoned. This application Jul. 20, 1988, Ser. No. 221,631
Term of patent 14 years
U.S. Cl. D28—35

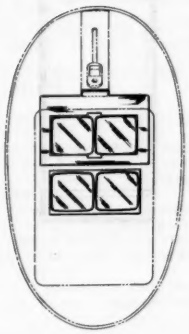


322,491
DENTAL FLOSSER
Joseph E. Huskey, P.O. Box 476, Copperhill, Tenn. 37317
Filed Aug. 21, 1990, Ser. No. 572,361
Term of patent 14 years
U.S. Cl. D28—64

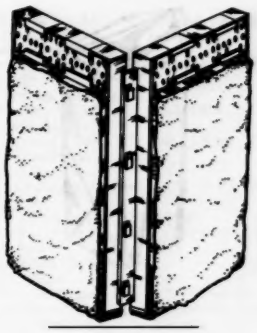
322,492
FACE MASK
Ann M. Walczewski, 3136 Carnegie Pl., San Diego, Calif. 92122, and Audrey M. Heckel, 452 Queen Anne Dr., Chula Vista, both of Calif. 92011
Filed Mar. 7, 1989, Ser. No. 320,041
Term of patent 14 years
U.S. Cl. D29—17



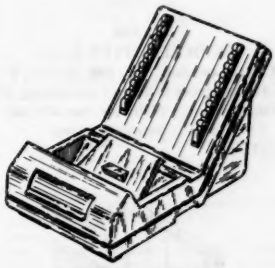
322,493
WELDING HOOD LENS SUPPORT
Sidney C. Metzger, 2114 Norman Way, Modesto, Calif. 95350
Filed Aug. 24, 1989, Ser. No. 398,469
Term of patent 14 years
U.S. Cl. D29—9



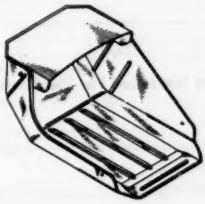
322,494
CAT SCRATCHING PAD
Evan B. Reynolds, 6691 Smokewood Cir., Anaheim Hills, Calif. 92807
Filed Jun. 25, 1990, Ser. No. 543,062
Term of patent 14 years
U.S. Cl. D30—158



322,495
SUPPORT FOR A RECHARGEABLE ELECTRIC IRON
Jan Klok, Hoogezand, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Dec. 15, 1988, Ser. No. 285,882
Claims priority, application World Int. Prop. O., Jul. 13, 1988, DM/011.342
Term of patent 14 years
U.S. Cl. D32—73

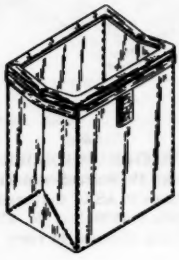


322,496
TRASH BAG HOLDER
Alan M. Weiss; Ricky D. Stafford, and Troy Watson, all of Dallas, Tex., assignors to ASAC Corporation, Dallas, Tex.
Filed Feb. 8, 1990, Ser. No. 476,676
Term of patent 14 years
U.S. Cl. D34—5



322,497
WASTE RECEPTACLE
Don F. Dunham, Houston, Tex., assignor to Dunham Container Corp.
Filed Sep. 22, 1989, Ser. No. 410,798
Term of patent 14 years
U.S. Cl. D34—1

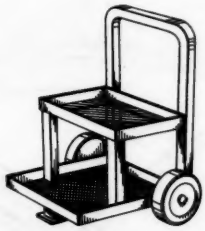
322,498
VEHICLE LITTER BAG
David L. McClees, Lewiston, Me., and Michael P. McConnell, Durham, N.H., assignors to Talus Corporation, Portland, Me.
Filed Mar. 12, 1990, Ser. No. 491,642
Term of patent 14 years
U.S. Cl. D34—1



322,499
Patent Not Issued For This Number

322,500
ICE CREAM CART
Petrus J. M. Van Stokkum, Vista Alegre, 11, 50oB, 07015 Palma de Mallorca, Spain
Filed Oct. 30, 1989, Ser. No. 428,737
Term of patent 14 years
U.S. Cl. D34—18

322,501
WELDING CART
Timothy J. Legault, 10 Lake Ave., Barrington, R.I. 02806
Filed Jul. 27, 1990, Ser. No. 558,984
Term of patent 14 years
U.S. Cl. D34—24



322,502
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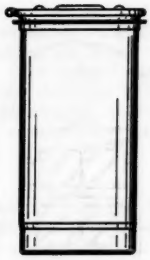
David L. Waltke, Beatrice, Nebr., assignor to Hoover Group, Inc., Alpharetta, Ga.
Filed Aug. 15, 1988, Ser. No. 232,377
Term of patent 14 years
U.S. Cl. D34—39



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PATENTS WERE ISSUED ON THE 17TH DAY OF DECEMBER, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A. Monforts GmbH & Co.: *See—*
Rontgen, Manfred, 5,072,824, Cl. 198-500.000.

AB Svenska Eketromagneter: *See—*
Bengtsson, Jorgen; and Agren, Anders, 5,072,714, Cl. 123-601.000.

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Abdulhalim, Ibrahim S.: *See—*
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Abe, Hiroomi: *See—*
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

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Yamamoto, Tadao; Abe, Tetsuya; Dohi, Masaaki; Hisatomi, Shinichi; Oishi, Mitsugu; Honda, Toshiro; Hayashi, Mitsuo; and Hirono, Takeo, 5,073,468, Cl. 430-110.000.

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DeWoody, Charles M., 5,073,348, Cl. 422-101.000.

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Coy, David H.; and Moreau, Jacques-Pierre, 5,073,624, Cl. 530-313.000.
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Advanced Mining Systems, Inc.: *See—*
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Rapoport, Uri; and Panosh, Richard, 5,072,732, Cl. 128-653.200.

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Lyons, Robert T., 5,073,383, Cl. 424-606.000.

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Yabe, Akira, 5,072,780, Cl. 165-1.000.

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Akao, Hideyuki: *See—*
Takano, Hiroshi; Masuda, Takashi; Kanaoka, Tomizo; Akao, Hideyuki; Hioki, Katsuyuki; and Aragane, Toshiaki, 5,073,147, Cl. 474-28.000.

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Kayano, Katsunari, 5,073,099, Cl. 425-125.000.

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Edlund, Leif E., 5,072,484, Cl. 15-319.000.
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Higa, Teruo, 5,073,257, Cl. 210-170.000.

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Mollett, Christopher C.; and Sneddon, Gordon R., 5,073,234, Cl. 162-5.000.

Alcatel N.V.: *See—*
Wunstel, Klaus; and Weinmann, Reinold, 5,073,894, Cl. 372-46.000.

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Cavalleri, Robert J.; and Readey, Harvey J., 5,072,891, Cl. 244-3.210.

APT Instruments Corp.: *See*—
Zhang, Hongmin, 5,073,863, Cl. 364-715.010.

Aragane, Toshiaki: *See*—
Takano, Hiroshi; Masuda, Takashi; Kanaoka, Tomizo; Akao, Hideyuki; Hioki, Katsuyuki; and Aragane, Toshiaki, 5,073,147, Cl. 474-28.000.

Araki, Kazuhiro: *See*—
Kitagawa, Tsuneo; and Araki, Kazuhiro, 5,073,794, Cl. 355-208.000.

Arena, Blaise J.; and Kurek, Paul R., to UOP. Synthesis of the 5- and 6-methyltetralins by continuous methylation of tetralin. 5,073,654, Cl. 585-467.000.

Arikawa, Takamasa: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.

Arima, Masatoshi; Nishizawa, Hiroaki; Takeuchi, Keiji; Deura, Hiroshi; and Ishida, Keiichiro, to Lion Corporation. Agent containing an ellagic acid series compound for external application and use thereof. 5,073,545, Cl. 514-27.000.

Arizona Board of Regents acting on behalf of Arizona State University: *See*—
Maracas, George N.; Ruechner, Ronald A.; and Gerber, Donald S., 5,073,230, Cl. 156-631.000.

Arizona Technology Development Corp.: *See*—
Sammons, David w.; Ko, Wen-Jeng; and Liu, Yi-Cheng, 5,073,963, Cl. 382-30.000.

Armiger, Ronald E.: *See*—
Jaenke, Paul E.; and Armiger, Ronald E., 5,073,121, Cl. 439-92.000.

Armstrong World Industries, Inc.: *See*—
Dees, Martin, Jr.; Felter, Richard E.; and Musser, Deborah L., 5,073,425, Cl. 428-48.000.

Arnone, A. Jeanne, to Myco, Inc. Display stand assembly. 5,072,839, Cl. 211-187.000.

Aronne, Armand J., to Grumman Aerospace Corporation. Custom-fitted harness for an aviator. 5,072,457, Cl. 2-102.000.

Aronne, Armand J., to Grumman Aerospace Corporation. Multi-purpose jerkin. 5,072,727, Cl. 128-202.110.

Aronne, Armand J., to Grumman Aerospace Corporation. Pilot harness fitting incorporating restraints for arms, legs, and aid of gravity. 5,072,897, Cl. 244-122.0AG.

Aronson, Michael: *See*—
Liberati, Patricia; McCown, Jack T.; Aronson, Michael; and van de Pas, Johannes C., 5,073,285, Cl. 252-94.000.

Aronson, Michael P.: *See*—
Hessel, John F.; Aronson, Michael P.; Cardinali, Martin S.; and Kaiserman, Howard B., 5,073,292, Cl. 252-174.120.

Arsem, Alvan D. Overhead projector display. 5,073,023, Cl. 353-42.000.

Arthur, Samuel D., to Du Pont de Nemours, E. I., and Company. Dicarboxylic acid polyesters and polyamides for fluid separation membranes. 5,073,176, Cl. 55-16.000.

Aruga, Shuji: *See*—
Sonehara, Tomio; Aruga, Shuji; and Morozumi, Shinji, 5,073,013, Cl. 359-63.000.

Arvesen, Jan, to Studsvik AB. Decontamination method. 5,073,333, Cl. 376-310.000.

Asada, Selichi: *See*—
Futamoto, Masaaki; Honda, Yukio; Asada, Selichi; Nishimura, Takashi; and Yoshida, Kazuetsu, 5,073,460, Cl. 428-694.000.

Asahi Glass Company, Ltd.: *See*—
Mimori, Takashi; Maeno, Hiroshi; Endo, Yasuhiko; and Morishita, Tomohiro, 5,073,178, Cl. 55-523.000.
Miura, Ryuichi; Moriwaki, Ken; Takeyasu, Hiromitu; Washita, Hiroshi; and Miyazaki, Nobuyuki, 5,073,613, Cl. 526-255.000.

Asahi Kogaku Kogyo K.K.: *See*—
Adachi, Rensuke; Miura, Shizuharu; and Sano, Hiroshi, 5,073,048, Cl. 385-115.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Ogawa, Kimiaki, 5,073,790, Cl. 354-400.000.

Asahina, Hiroshi; and Yasuhara, Hiroshi, to Kabushiki Kaisha Toshiba. Steroescopic x-ray apparatus. 5,073,914, Cl. 378-42.000.

Asakawa, Yoshio; and Suezaki, Yasunaga. Medical bed apparatus. 5,072,840, Cl. 212-205.000.

Asakura, Hiroyuki: *See*—
Tabata, Katsuhiro; Hayase, Masahiro; Asami, Hajime; Asakura, Hiroyuki; and Mitsui, Kenji, 5,073,689, Cl. 219-10.491.

Asami, Hajime: *See*—
Tabata, Katsuhiro; Hayase, Masahiro; Asami, Hajime; Asakura, Hiroyuki; and Mitsui, Kenji, 5,073,689, Cl. 219-10.491.

ASCH Corporation: *See*—
Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, 5,073,926, Cl. 379-53.000.

Ashizawa, Katsuya: *See*—
Hamada, Yoshikazu; Ogino, Yozo; and Ashizawa, Katsuya, 5,072,975, Cl. 292-201.000.

AT&T Bell Laboratories: *See*—
Clark, Harold R., 5,073,003, Cl. 385-33.000.
Clayton, Jane B.; El, Muhammad A.; Freeman, Lucius J.; and Miller, Calvin M., 5,073,004, Cl. 385-27.000.
Clemens, James T.; and Hong, Shane Y., 5,073,716, Cl. 250-492.200.
Danielsen, Peter J., 5,073,890, Cl. 370-58.200.
Giles, Clinton R.; Li, Tingye; and Wood, Thomas H., 5,073,981, Cl. 359-174.000.

Atarashi, Hisashi: *See*—
Takafuji, Yutaka; Inami, Takashi; and Atarashi, Hisashi, 5,073,772, Cl. 340-784.000.

Athens Research and Technology, Inc.: *See*—
Lloyd, Cynthia A., 5,073,487, Cl. 435-23.000.

Attison, Daniel J. Rotating positioning platform. 5,072,462, Cl. 5-60.000.

Atwell, William A.; Domingues, David J.; Beckmann, Paul J.; Panama, Julio R.; and Fahrenholtz, Steven K., to Pillsbury Company, The. Process of forming a microwaveable food product having a selected color. 5,073,392, Cl. 426-231.000.

Aubrey, Truman R., to Janice Industries, Inc. Fluorescent retrofit light fixture. 5,073,845, Cl. 362-226.000.

Audebert-Delahaye-Venture: *See*—
Audebert, Yves; and Delahaye, Achille, 5,073,931, Cl. 380-23.000.

Audebert, Yves; and Delahaye, Achille, to Audebert-Delahaye-Venture. System and individual device for participation in a broadcast program. 5,073,931, Cl. 380-23.000.

Aumercier, Laurent, to Ferco International Usine de Ferrures de Batiment. Hinge for door or window, the leaf frame of which is partially overlapping the sash-frame. 5,072,489, Cl. 16-361.000.

Aunet, Diane L.: *See*—
Siegel, Neal A.; Tripp, Edward S.; Aunet, Diane L.; and Georgevich, Gradimir G., 5,073,216, Cl. 156-73.300.

Austin, V. Dardanella: *See*—
Box, David W., 5,073,699, Cl. 219-433.000.

Australian national University, The: *See*—
Clark-Walker, George D., 5,073,489, Cl. 435-172.300.

Automatic Braiding Limited: *See*—
Easom, Peter W.; and Bridle, Stephen P., 5,072,677, Cl. 112-121.270.

Automobiles Citroen: *See*—
Lecocq, Jean-Luc, 5,073,902, Cl. 375-36.000.

Automobiles Peugeot: *See*—
Lecocq, Jean-Luc, 5,073,902, Cl. 375-36.000.

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Jarvis, Roger P., 5,072,815, Cl. 192-0.080.

Avakian, Roger W.; Parekh, Shashi L.; Shenian, Popkin; and Teutsch, Erich O., to General Electric Company. Articles from mixed scrap plastics. 5,073,416, Cl. 428-2.000.

Avibank Mfg., Inc.: *See*—
Chang, Peter, 5,073,070, Cl. 411-353.000.
Duran, John A., 5,073,075, Cl. 411-552.000.

Avillez de Basto, Luiz J. M. Recreation boat/trailer vehicle. 5,072,963, Cl. 280-414.100.

Avon Products, Inc.: *See*—
McCoy, John W.; and Steenrod, Wayne, 5,072,747, Cl. 134-48.000.

AVT Anlagen - und Verfahrenstechnik GmbH: *See*—
Krambrock, Wolfgang, 5,072,758, Cl. 137-625.470.

Aware, Inc.: *See*—
Resnikoff, Howard, 5,073,964, Cl. 382-41.000.

Axenov, Vladimir V.: *See*—
Gorbunov, Valery F.; Eller, ALexandr F.; Tkachenko, ALexandr Y.; Axenov, Vladimir V.; and Nagorny, Vladimir D., 5,072,992, Cl. 299-33.000.

Axiuk, Oleg: *See*—
Walling, Jorg-Hein; Axiuk, Oleg; and Dickenson, Robert, 5,073,682, Cl. 174-70.00A.

Ayala Martinez, Guillermo; and de Ferrer Daroca, Juan A. Extraction system of geothermal energy. 5,072,783, Cl. 165-45.000.

Ayers, Jack D.: *See*—
Anderson, Iver E.; and Ayers, Jack D., 5,073,409, Cl. 427-217.000.

Azuma, Kishiro: *See*—
Takagi, Osamu; Azuma, Kishiro; and Iwamura, Tatsuichi, 5,073,357, Cl. 423-308.000.

A2C Groupe Pratic-Ademva: *See*—
Casset, Jacques; and Lavorel, Gerard, 5,072,872, Cl. 226-176.000.

B.B. Romico B.V. i.o.: *See*—
Brouwers, Jozef J. H., 5,073,177, Cl. 55-317.000.

B. F. Goodrich Company, The: *See*—
Budd, James M.; Sheehan, Philip W.; and Warren, John H., 5,072,611, Cl. 73-118.100.

B & G Plastics, Inc.: *See*—
Kolton, Chester; and Spater, Stuart S., 5,072,866, Cl. 223-91.000.

Babcock & Wilcox Company, The: *See*—
Sherrick, Ronald E., 5,072,616, Cl. 73-293.000.

Babinet, Charles; and Morello, Dominique, to Institut Pasteur. Transhybridomas. 5,073,490, Cl. 435-240.200.

Babu, Suresh R.; Glinecke, Robert; Murtha, John L.; and Radebaugh, Galen W., to McNeil-PPC, Inc. Oral sustained release pharmaceutical formulation and process. 5,073,380, Cl. 424-472.000.

Bacher, Walter; Biedermann, Hans; and Harmening, Michael, to Kernforschungszentrum Karlsruhe GmbH. Method of making molds for electrodeposition forming of microstructured bodies. 5,073,237, Cl. 264-320.000.

Baek, Hoon-Kee, to SamSung Electronics Co., Ltd. Low voltage protection circuit. 5,073,837, Cl. 361-92.000.

Baer, Patrick H.; Connolly, Timothy F.; Kopinski, Gerald P.; Rowley, Curtis E.; and Senkow, Anthony W., to Chrysler Corporation. Method for evaluation of fluid flow within a simulated combustion chamber. 5,072,613, Cl. 73-119.00R.

Bailey, David W.: *See*—
Schmitt, Larry D.; and Bailey, David W., 5,073,225, Cl. 156-401.000.

Bailey, John M. Golf course fairway including distance marker. 5,072,940, Cl. 273-176.00A.

Baker, John L.: *See—*
Lowder, James E.; Shinn, Ronald R.; and Baker, John L., 5,072,588, Cl. 60-571.000.

Baker, Raymond; Street, Leslie J.; and Saunders, John, to Merck Sharp & Dohme Limited. Novel substituted pyrazine, formulations thereof and use in medicine. 5,073,557, Cl. 514-254.000.

Baker, William: *See—*
Gudgel, Robert C.; and Baker, William, 5,072,973, Cl. 292-55.000.

Baldner, Klaus: *See—*
Koehler, Winfried; Hornauer, Klaus-Peter; Kopp, Reiner; Baldner, Klaus; and Wuestefeld, Frank, 5,072,606, Cl. 72-53.000.

Ball, Laurence G.: *See—*
Price, Macy J., Jr.; Ball, Laurence G.; and Johnson, Mack E., 5,072,835, Cl. 211-40.000.

Ball, Will D., IV, to Natco. Apparatus for separating commingling heavier and lighter immiscible. 5,073,266, Cl. 210-519.000.

Banba, Takashi: *See—*
Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, 5,073,659, Cl. 585-600.000.

Banks, Christopher P.; and Irving, Edward, to Ciba-Geigy Corporation. Method of making a metallic pattern on a substrate. 5,073,233, Cl. 156-656.000.

Banks, Christopher P.; and Irving, Edward, to Ciba-Geigy Corporation. Method of making a pattern. 5,073,478, Cl. 430-317.000.

Banks, Edgar N. Drum apparatus for mixing asphalt compositions. 5,073,030, Cl. 366-25.000.

Banner American Products, Inc.: *See—*
Parkhill, Alan J.; and Cook, Roy P., 5,073,076, Cl. 412-33.000.

Barbier, William J. Apparatus for detecting small bubbles in a pressurized fluid stream. 5,072,595, Cl. 62-129.000.

Barbone, Noram K., to Implant Plastics Corporation. Articulating ball coping and associated devices. 5,073,110, Cl. 433-173.000.

Bardasz, Ewa A.: *See—*
Veazey, Richard L.; and Bardasz, Ewa A., 5,073,300, Cl. 252-392.000.

Barich, John J.: *See—*
Chu, Daniel Y.; and Barich, John J., 5,073,246, Cl. 204-299.00R.

Barley, Thomas A.; Alexander, Pierre M.; and Rast, Gustaf J., Jr., to United States of America, Army. Cooperative passive identification system for moving or stationary objects. 5,073,780, Cl. 342-45.000.

Barnea, Daniel: *See—*
Spector, Avner; Rutiser, Sylvia; and Barnea, Daniel, 5,072,733, Cl. 128-660.030.

Barr, David W. Slingshot incorporating improved features for increased energy storage and enhanced performance. 5,072,715, Cl. 124-20.100.

Barret, Marcel: *See—*
Bozetto, Pierre; Truchet, Jean-Marc; Barret, Marcel; and Guy, Chauvier, 5,072,553, Cl. 52-63.000.

Barth, Wolfgang: *See—*
Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, 5,073,538, Cl. 512-9.000.

BASF Aktiengesellschaft: *See—*
Dix, Johannes P.; Hansen, Guenter; and Kast, Hellmut, 5,073,634, Cl. 544-103.000.
Frickel, Fritz-Frieder; Kuekenhoehner, Thomas; Rendenbach-Mueller, Beatrice; Weifenbach, Harald; and Teschendorf, Hans-Juergen, 5,073,563, Cl. 514-365.000.
Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, 5,073,538, Cl. 512-9.000.
Klimesch, Roger; Bleckmann, Gerhard; Farwerck, Karl-Peter; Schlemmer, Lothar; and Sanner, Axel, 5,073,379, Cl. 424-467.000.
Lauke, Harald; Schuermann, Gregor; Sandig, Hartmut; and Loerzer, Thomas, 5,073,475, Cl. 430-278.000.
Neubert, Gerhard, 5,073,585, Cl. 524-139.000.
Rehmer, Gerd; and Boettcher, Andreas, 5,073,611, Cl. 526-208.000.
Sander, Bruno; Marquardt, Siegfried; Kempe, Uwe; Vodrazka, Wolfgang; and Lueth, Gero, 5,073,271, Cl. 210-710.000.
Schwalm, Reinhold; Binder, Horst; and Boettcher, Andreas, 5,073,474, Cl. 430-270.000.
Stabel, Uwe; Gosch, Hans-Juergen; Fischer, Rolf; Harder, Wolfgang; and Hechler, Claus, 5,073,650, Cl. 568-864.000.
Sterzel, Hans-Josef, 5,073,319, Cl. 264-101.000.
Sterzel, Hans-Josef, 5,073,320, Cl. 264-101.000.

BASF Corporation: *See—*
Denzinger, Walter; Hartmann, Heinrich; Goeckel, Ulrich; Richter, Felix; Raubenheimer, Hans-Juergen; and Winkler, Ekhard, 5,073,269, Cl. 210-698.000.
Kuyzin, Gregg S.; and Stoll, John R., 5,073,576, Cl. 521-99.000.
Otten, Jay G.; Parker, Edward J.; and Kinnaird, Michael G., 5,073,286, Cl. 252-97.000.

BASF Lacke+Farben Aktiengesellschaft: *See—*
Prantl, Bernhard; Walz, Rolf; and Stark, Erwin, 5,073,623, Cl. 530-210.000.

Bassarutti, Alfredo: *See—*
Tosini, Riccardo; and Bassarutti, Alfredo, 5,072,779, Cl. 164-415.000.

Batchelder, Bruce; and Rafferty, Scott, to Davidson Textron Inc. Instrument panel with invisible airbag deployment door. 5,072,967, Cl. 280-732.000.

Bateman, Paul M.: *See—*
Ivey, John S.; Bateman, Paul M.; Clauss, Julius A.; Cole, Edward H., Jr.; and Mott, Philip J., 5,073,154, Cl. 474-213.000.

Battelle Memorial Institute: *See—*
Smith, Richard D.; Udseth, Harold R.; and Rockwood, Alan L., 5,073,713, Cl. 250-282.000.

Bauer, Daniel: *See—*
Vayssie, Charles; Bauer, Daniel; Richard, Francoise; and Junino, Alex, 5,073,174, Cl. 8-406.000.

Bauer, Klaus: *See—*
Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,073,185, Cl. 71-091.000.

Baumann, Kurt: *See—*
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Bayer Aktiengesellschaft: *See—*
Frobel, Klaus; Bischoff, Erwin; Muller, Hartwig; Salcher, Olga; De Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 5,073,369, Cl. 424-121.000.
Ostoja-Starzewski, Karl-Heinz A., 5,073,014, Cl. 359-490.000.

Bayerische Motoren Werke AG: *See—*
Freymann, Raymond; Keck, Albrecht; and Haas, Anton, 5,072,801, Cl. 180-68.500.

Bearden, Francis H.: *See—*
DeMeester, Gordon D.; Denison, Kenneth S.; and Bearden, Francis H., 5,073,752, Cl. 324-309.000.

Beatty, Robert F.: *See—*
Sutton, Robert F.; Scharrer, Joseph K.; and Beatty, Robert F., 5,073,036, Cl. 384-107.000.

Beaudet, Manon J. Method for setting ophthalmic lenses in goggles. 5,073,324, Cl. 264-255.000.

Beautement, Kevin: *See—*
Anthony, Vivienne M.; Clough, John M.; deFraine, Paul; Godfrey, Christopher R. A.; and Beautement, Kevin, 5,073,184, Cl. 71-90.000.

Beck, Fred. Analgesic composition useful in providing a temporary relief from symptoms of arthritis. 5,073,366, Cl. 424-720.000.

Beck, Hoy S., Jr., to AMP Incorporated. Surface mount LCC socket. 5,073,116, Cl. 439-71.000.

Beck, Norman G., to Copeland Corporation. Compressor valving. 5,073,146, Cl. 417-571.000.

Beck, Patricia A.: *See—*
Kino, Gordon S.; Chim, Stanley S. C.; and Beck, Patricia A., 5,073,018, Cl. 359-368.000.

Beck, William R.: *See—*
McArdle, Ciaran B.; Clark, Michael G.; Beck, William R.; and Bowry, Carolyn, 5,073,219, Cl. 156-242.000.

Becker, Rainer: *See—*
Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, 5,073,538, Cl. 512-9.000.

Beckerleg, Richard A.: *See—*
Klaus, Benjamin, Jr.; MacKenzie, Gordon C.; and Beckerleg, Richard A., 5,072,890, Cl. 244-3.160.

Beckmann, Paul J.: *See—*
Atwell, William A.; Domingues, David J.; Beckmann, Paul J.; Panama, Julio R.; and Fahrenholtz, Steven K., 5,073,392, Cl. 426-231.000.

Becton, Dickinson and Company: *See—*
Covington, Gloria J.; and Bloomster, Timothy G., 5,073,340, Cl. 422-56.000.

Beech, James H., Jr.; Owen, Hartley; Ramage, Michael P.; and Tabak, Samuel A., to Mobil Oil Corporation. Production of middle distillate range hydrocarbons by light olefin upgrading. 5,073,351, Cl. 422-190.000.

Beegan, Desmond: *See—*
Corrigan, Niall; Keating, Gerry; and Beegan, Desmond, 5,073,074, Cl. 411-393.000.

Behrendorf, Norbert: *See—*
Kruck, Thomas; Behrendorf, Norbert; and Faubel, Heiko, 5,073,645, Cl. 556-13.000.

Beijing Institute of Nuclear Engineering: *See—*
Zhang, Cao H.; Chang, Tao L.; and De, Pan Y., 5,073,915, Cl. 378-54.000.

Beisenherz, Kurt; and Knodel, Waldemar R., to Heinrich Fiedler GmbH & Co. KG. Cylindrical screening basket. 5,073,254, Cl. 209-273.000.

Beiswenger, John L.: *See—*
Draheim, Harvey J.; Charlson, Glenn T.; Beiswenger, John L.; and Brunner, Merlin A., 5,072,464, Cl. 5-93.100.

Bell Communications Research, Inc.: *See—*
Kastani, Kasra, 5,073,041, Cl. 385-33.000.

Bell, Craig J.: *See—*
Hollister, William H.; Bell, Craig J.; and Carruthers, Cary D., 5,073,164, Cl. 604-43.000.

Bell, Mark, to American Cyanamid Company. Pesticidal aqueous flowable compositions. 5,073,189, Cl. 71-92.000.

Bellows, James C., to Westinghouse Electric Corp. Chemical diagnostic system. 5,073,499, Cl. 436-50.000.

Belmondo, Domenico, to Dobell S.p.A. Monolythic cap for writing implements. 5,073,056, Cl. 401-202.000.

Beloit Corporation: *See—*
Montgomery, Jim R., 5,072,624, Cl. 73-863.910.

Beltz, Mark W.; and Ramachandran, Venkataraman, to Ethyl Corporation. Substituted benzophenone dicarboxylic acids. 5,073,552, Cl. 549-214.000.

Bencharab, Christian; Bonnet, Patrick; and Nithart, Henri, to GEC Alsthom SA. Superconducting conductor having multiple transposed strands with internal cooling channels, and method of manufacture. 5,073,679, Cl. 174-15.500.

Benedek, George B.: *See—*
Taratuta, Victor G.; Thurston, George M.; and Benedek, George B., 5,072,731, Cl. 128-633.000.

Benedict, William: *See—*
Gumm, Linley F.; and Benedict, William, 5,073,822, Cl. 358-139.000.

Bengtsson, Jorgen; and Agren, Anders, to AB Svenska Eketromagneter. Arrangement for generator windings, especially in ignition systems. 5,072,714, Cl. 123-601.000.

Bennett, M. Dickson, to Dickson Product Development, Inc. Electrical box mounting tool. 5,072,523, Cl. 33-528.000.

Benoit, Luc P.: *See—*
Chang, Milton M. T.; and Benoit, Luc P., 5,072,541, Cl. 43-124.000.

Bensch, Guenther: *See—*
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Beral Enterprises, Inc.: *See—*
Garren, Ralph F.; and Martirosian, Ara, 5,073,347, Cl. 422-100.000.

Beran, Anthony V.; and Shigezawa, Gordon. Single thermistor/analog converter substitute for a dual thermistor network. 5,073,034, Cl. 374-183.000.

Berelman-Hall, David K.: *See—*
Colbert, Charles; Jerison, Andrew D.; Berelman-Hall, David K.; Moles, Donald R.; and Potter, Nathan D., 5,073,950, Cl. 382-2.000.

Bergman, Elliot: *See—*
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and Lefiles, James H., 5,073,191, Cl. 71-121.000.

Bergmann, Marco; and Rebel, Herbert, to MAN Roland Druckmaschinen AG. Gap cover for blanket cylinders in sheet-fed offset rotary presses. 5,072,670, Cl. 101-415.100.

Berion, Roland; and Garnier, Dominique, to Efisol. Mixing device for bulk impregnation of particulate matter by a binder. 5,073,032, Cl. 366-168.000.

Berkel & Company: *See—*
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Berkhoff, Egbertus J.: *See—*
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Berner, Bret: *See—*
Mazzenga, Gerard C.; and Berner, Bret, 5,073,539, Cl. 514-2.000.

Bersch, Friedrich. Apparatus for cleaning pipelines for beverages and the like. 5,072,476, Cl. 15-3.510.

Berschauer, Friedrich: *See—*
Frobel, Klaus; Bischoff, Erwin; Muller, Hartwig; Salcher, Olga; De Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 5,073,369, Cl. 424-121.000.

Bertelson, Peter C. Methods for making fiber reinforced wheels and other structural moldings. 5,073,315, Cl. 264-25.000.

Berthet, Michelle M. N. C.; Trego, Brian R.; and Wessely, Hans-Juergen, to Dow Corning S.A. Filled compositions. 5,073,586, Cl. 524-159.000.

Bertram, Michael J.; Andrews, Daniel M.; and Bishop, Thomas A., to Microelectronics and Computer Technology Corporation. Method and apparatus for using desoldering material. 5,072,874, Cl. 228-264.000.

Bertrand, Gary L.: *See—*
Collier, Harvest L.; Bertrand, Gary L.; and Venable, Raymond L., 5,073,289, Cl. 252-162.000.

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Pinto, Akiva; Lucassen, Guenter; and Bocht, Bernhard, 5,072,491, Cl. 19-145.500.
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McArdle, Ciaran B.; Clark, Michael G.; Beck, William R.; and Bowry, Carolyn, 5,073,219, Cl. 156-242.000.
Box, David W., to Austin, V. Dardanella. Device for warming food and beverage containers having support plate and perimeter skirt structure. 5,073,699, Cl. 219-433.000.
Boyd, Dennis. Waterbed mattress with air cushion. 5,072,469, Cl. 5-451.000.
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Braden, Jeffrey S., to Olin Corporation. Method for housing a tape-bonded electronic device and the package employed. 5,073,521, Cl. 437-209.000.
Bragos, Ramon: *See*—
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Brandelik, Alexander, to Kernforschungszentrum Karlsruhe GmbH. Method and apparatus for measuring the volumetric water content of mineral and/or organic mixtures. 5,073,756, Cl. 324-643.000.
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Brashier, James W. Divided beverage server. 5,072,858, Cl. 222-144.500.
Breck, Louis W., Jr. Motorized pet door apparatus. 5,072,544, Cl. 49-264.000.
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Bridges, Ian G.; Schuch, Wolfgang W.; and Grierson, Donald, to Imperial Chemical Industries PLC. Tomato anti-sense pectin esterase. 5,073,676, Cl. 800-205.000.
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Suzuki, Shoujyu; and Takasuga, Yutaka, 5,073,226, Cl. 156-417.000.
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Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 5,073,549, Cl. 514-183.000.
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Luke, John A.; Case, Paul D.; and Hemsley, Stephen R., 5,072,744, Cl. 131-375.000.
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Kemlo, Kenneth G., 5,073,104, Cl. 431-12.000.
Bromley, Patrick J.; and Luxton, Grenville G. H., to Motor Panels (Coventry) Ltd. Control systems for automotive air conditioning systems. 5,072,597, Cl. 62-209.000.
Brook, Richard L., to Morton International, Inc. Modified polypropylene power suspended in film-forming resin. 5,073,594, Cl. 525-65.000.
Brooks, Lawrence D., to Rockwell International Corporation. Independent polarization state measurements sensor. 5,073,025, Cl. 356-367.000.
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Kawamoto, Naoyuki; Yoshida, Hitoshi; and Kanegae, Takahiro, 5,073,956, Cl. 382-22.000.
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Nakashima, Akifumi, 5,072,680, Cl. 112-445.000.
Takagi, Kazuhiko; and Sonoda, Rikuo, 5,073,055, Cl. 400-578.000.
Brotz, Gregory R. Large sphere production method and product. 5,073,317, Cl. 264-29.100.
Brouwer, Charles W.; and Cowan, Larry C. Take-up mechanism. 5,072,889, Cl. 242-35.50R.
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Pistor, Helmut H.; and Brown, James C., 5,073,022, Cl. 352-223.000.
Brown, Paul: *See*—
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Brown, Robert L., to White Consolidated Industries, Inc. Windrow paving machine and method of paving. 5,073,063, Cl. 404-101.000.
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Browning Automatic Transmission: *See*—
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Bruttel, Beat; and Kvita, Petr, to Ciba-Geigy Corporation. Encapsulated fluorescent whitening agent, photoativator or anti-microbial agent. 5,073,295, Cl. 252-301.190.

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Bundgaard, Hans; and Nielsen, Niels M. Prodrug derivatives of carboxylic acid drugs. 5,073,641, Cl. 560-56.000.

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Burger, Hans; and Grimm, Dieter. Air supply system for a firebox. 5,072,719, Cl. 126-515.000.

Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., to Vickers, Incorporated. Power transmission. 5,073,091, Cl. 60-222.00R.

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Burke, Elliot M., to Medical Concepts, Inc. Lens system for compact camera. 5,073,016, Cl. 359-727.000.

Burke, Ronald A., Jr. Lock-out enclosure for power connector. 5,073,122, Cl. 439-134.000.

Burkes, Alice L.: *See*—
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Burlant, William J.: *See*—
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Burres, Neal: *See*—
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Calder, David: *See*—
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Califano, Andrea, to International Business Machines Corporation. Generalized neighborhoods parameter transform for image features extraction. 5,073,962, Cl. 382-27.000.

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California Pellet Mill Company: *See*—
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Calmar Inc.: *See*—
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Cambustion, Limited: *See*—
Collings, Nicholas; Dinsdale, Steven; and Willey, Jonathan, 5,073,753, Cl. 324-468.000.

Camco International Inc.: *See*—
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Campbell, Keith D.: *See*—
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Campbell, Norman J. Workpiece clamping device. 5,072,918, Cl. 269-296.000.

Campbell, Randolph N.: *See*—
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Camus, Mark. Cargo platform assembly mounted to a helicopter. 5,072,895, Cl. 244-118.100.

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Inagawa, Hideho; and Nojo, Shigenobu, 5,073,687, Cl. 219-121.700.
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Hale, Thomas E., 5,073,411, Cl. 427-252.000.

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Grimm, William L.; and Sheets, Charles E., 5,072,793, Cl. 172-266.000.
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Cash, Dennis R.: *See*—
Bezman, Richard D.; and Cash, Dennis R., 5,073,530, Cl. 502-65.000.
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Murata, Yoshiyuki, 5,072,643, Cl. 84-293.000.
Yamamoto, Tadao; Abe, Tetsuya; Dohi, Masaaki; Hisatomi, Shinichi; Oishi, Mitsugu; Honda, Toshiro; Hayashi, Mitsuo; and Hirono, Takeo, 5,073,468, Cl. 430-110.000.
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Cassidy, Joseph C. Fluid piston compressor. 5,073,090, Cl. 417-102.000.
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Krahn, Darren L.; and Wible, John E., 5,072,648, Cl. 91-52.000.
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Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.
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Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.
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Meszaros, Peter; and Stern, Peter, 5,073,584, Cl. 524-101.000.
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Cheng, Jung-Jen A.; Martinez, Wilfred A.; and Hale, Amy P., to Quigley Company, Inc. Lightweight tundish refractory composition. 5,073,525, Cl. 501-81.000.
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Johnson, Richard J.; Chenoweth, Dennis E.; Boggs, Daniel R.; and Lysaght, Michael J., 5,073,265, Cl. 210-500.230.
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Kline, Jules M.; Miller, Stephen J.; and Mulaskey, Bernard F., 5,073,250, Cl. 208-65.000.
Chicago Bridge & Iron Technical Services: *See*—
Kiziltug, Arif Y., 5,072,600, Cl. 62-540.000.
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Yoshimura, Ichiro; Matsuda, Yasuo; and Chigusa, Yoshiki, 5,073,179, Cl. 65-2.000.
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, to Mobil Oil Corp. Process for alkylating olefins and isoparaffins in a fixed bed reactor. 5,073,665, Cl. 585-722.000.
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Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., 5,073,677, Cl. 800-205.000.
Chim, Stanley S. C.: *See*—
Kino, Gordon S.; Chim, Stanley S. C.; and Beck, Patricia A., 5,073,018, Cl. 359-368.000.
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Cho, Frederick Y.: *See*—
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Kwon, Oh-Hyun; Jang, Taek-Yong; Shin, Jung-Hyun; and Choi, Won-Taek, 5,073,510, Cl. 437-40.000.
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Baer, Patrick H.; Connolly, Timothy F.; Kopinski, Gerald P.; Rowley, Curtis E.; and Senkow, Anthony W., 5,072,613, Cl. 73-119.00R.
Chu, Daniel Y.; and Barich, John J., to Bio-Rad Laboratories, Inc. Slab electrophoresis system with improved sample wells and cooling mechanism. 5,073,246, Cl. 204-299.00R.
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Shih, Jenn S.; Smith, Terry E.; and Chuang, Jui-Chang, 5,073,614, Cl. 526-258.000.
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Bruttel, Beat; and Kvita, Petr, 5,073,295, Cl. 252-301.190.
Cook, Barry, 5,073,299, Cl. 252-389.230.

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Meier, Kurt; Haug, Theobald; and Scharf, Wolfgang, 5,073,438, Cl. 428-224.000.

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Scheibli, Peter, 5,073,631, Cl. 534-634.000.

Schumacher, Rolf; Evans, Samuel; and Dubs, Paul, 5,073,278, Cl. 252-47.500.

Vieira, Eric; and Laver, Hugh S., 5,073,448, Cl. 428-331.000.

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Endo, Mamoru; and Hamatsu, Masahiro, 5,073,898, Cl. 375-1.000.

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McArdle, Ciaran B.; Clark, Michael G.; Beck, William R.; and Bowry, Carolyn, 5,073,219, Cl. 156-242.000.

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Ivey, John S.; Bateman, Paul M.; Clauss, Julius A.; Cole, Edward H., Jr.; and Mott, Philip J., 5,073,154, Cl. 474-213.000.

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Colbert, Charles; Jerison, Andrew D.; Berelman-Hall, David K.; Moles, Donald R.; and Potter, Nathan D., to Personnel Identification & Entry Access. Finger profile identification system. 5,073,950, Cl. 382-2.000.

Colby, David M.: *See*—
Fagundes, Carlos A.; McDermott, Thomas C., Jr.; and Colby, David M., 5,073,263, Cl. 210-321.830.

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Weaver, Barry A.; and Whitt, Douglas E., 5,072,981, Cl. 294-102.100.

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Weil, Eberhard, 5,073,112, Cl. 433-221.000.

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Chuiton, Rene ; Chemtob, Maurice; and Kissel, Philippe, 5,073,715, Cl. 250-370.010.
Valette, Serge; and Renard, Stephane, 5,073,024, Cl. 356-345.000.

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Moracz, Donald J.; and Shipley, Roch J., 5,072,871, Cl. 228-193.000.

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Conaway, Lawrence S.; Nagel, Marc F.; and Pera, John D., to Buckman Laboratores International, Inc. Process for the production of 2-thiocyanomethylthiobenzothiazole. 5,073,638, Cl. 548-169.000.

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Combette, Marc, 5,073,734, Cl. 310-65.000.

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Shen, Jyi-Sheng J., 5,073,615, Cl. 526-262.000.

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Cook, C. Edgar; Wani, Mansukh C.; Lee, Yun W.; Reel, Jerry R.; and Rector, Douglas, to Research Triangle Institute. 11 β-substituted progesterone analogs. 5,073,548, Cl. 514-169.000.

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Cooper, Brian G., to Rolls-Royce plc. Cooled aerofoil blade. 5,073,086, Cl. 416-96.00R.

Cooper Industries, Inc.: *See*—
Postlewait, Lester B.; and Newton, Charles M., 5,073,758, Cl. 324-713.000.

Cooper Power Systems, Inc.: *See*—
Denner, Harry T., 5,073,765, Cl. 336-210.000.

Cooper, Steven R.: *See*—
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Takagi, Masaaki; Nakamura, Shigekazu; and Omura, Atsushi, 5,073,710, Cl. 250-231.140.

Copeland Corporation: *See*—
Beck, Norman G., 5,073,146, Cl. 417-571.000.

Coppedge, Joe L., Sr.: *See*—
Holland, John C.; and Coppedge, Joe L., Sr., 5,072,955, Cl. 280-32.500.

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Zemanian, Thomas S.; Gold, Thomas; Streett, William B.; and Zollweg, John A., 5,073,666, Cl. 585-734.000.

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Foster, Gordon F.; Havewala, Noshir B.; and Shoup, Robert D., 5,073,181, Cl. 65-24.000.

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Anton, Douglas R., 5,073,288, Cl. 252-162.000.
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Hansen, Steven M., 5,073,322, Cl. 264-103.000.
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Lee, Kiu-Seung, 5,073,440, Cl. 428-224.000.
Palladino, John V., 5,073,456, Cl. 428-446.000.
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Marino, Frank, 5,073,967, Cl. 392-406.000.
Peng, Johnson, 5,073,088, Cl. 416-247.00R.
Duran, John A., to Avibank Mfg., Inc. Panel hole closure assembly. 5,073,075, Cl. 411-552.000.
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Nunes, Odilon D.; and Duran, Nelson E. C., 5,073,630, Cl. 530-400.000.
Durand, Roger. Eraser. 5,072,483, Cl. 15-210.00R.
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Huser, Peter, 5,072,638, Cl. 83-24.000.
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Rossum, David P., 5,072,645, Cl. 84-660.000.
EAC Systems, Inc.: *See—*
Hansen, David; and Mahoney, Patrick F., 5,072,833, Cl. 209-3.300.
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Hung, Liang-Sun; and Chatterjee, Dilip K., 5,073,537, Cl. 505-1.000.
Mirlieb, Bernd; Baumann, Kurt; and Killguss, Heinz, 5,073,916, Cl. 378-181.000.
Paz-Pujalt, Gustavo R., 5,073,410, Cl. 427-226.000.
Ponticello, Ignazio S., 5,073,603, Cl. 525-350.000.
Porte, Johannes J.; and Jakubowicz, Raymond F., 5,073,342, Cl. 422-64.000.
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Eaton, John W. Biocompatible materials comprising albumin-binding dyes. 5,073,171, Cl. 604-266.000.
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Burrows, Bruce D., 5,072,590, Cl. 62-3.640.
Burrows, Bruce D., 5,073,312, Cl. 261-140.100.
Eckert, Richard M.: *See—*
Hill, Ronald C.; Eckert, Richard M.; and Marzullo, Anthony, 5,072,620, Cl. 72-414.000.
Ecogen Inc.: *See—*
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Eddy, Victoria J.: *See—*
Hallgren, John E.; and Eddy, Victoria J., 5,073,605, Cl. 525-396.000.
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Kilian, Ulrich; Gotz, Jurgen; Hainbuch, Claus-Michael; and Edenhofer, Berthold, 5,072,803, Cl. 180-141.000.
Edlund, Leif E., to Aktiebolaget Electrolux. Vaccum cleaner suction control. 5,072,484, Cl. 15-319.000.
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Elin, Lewis R., 5,072,456, Cl. 2-94.000.
Edwards, Bill R. Polymeric composition and method of producing same. 5,073,587, Cl. 524-166.000.
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Berion, Roland; and Garnier, Dominique, 5,073,032, Cl. 366-168.000.
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Gatschmann, Klaus G.; and Schutze, Gunter, 5,072,740, Cl. 131-75.000.
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Hendricks, William G.; and Eimer, Richard A., 5,072,538, Cl. 43-4.000.

Eisai Co., Ltd.: *See—*
Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, 5,073,659, Cl. 585-600.000.
Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, 5,073,375, Cl. 424-449.000.

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Muller, Anton; and Witzel, Gunter, 5,072,763, Cl. 152-243.000.

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El, Muhammad A.: *See—*
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Electric Power Research Institute, Inc.: *See—*
Wachter, Willliam J., 5,072,786, Cl. 165-69.000.

Electricite de France (Service National): *See—*
Bozetto, Pierre; Truchet, Jean-Marc; Barret, Marcel; and Guy, Chauvier, 5,072,553, Cl. 52-63.000.

ElectroCom Automation, Inc.: *See—*
Van Tyne, Richard G.; Neff, Marion W.; and Mondie, George R., 5,073,954, Cl. 382-18.000.

Electronic Voting Systems, Inc.: *See—*
Trotta, Frank; and Gray, Gary, 5,072,999, Cl. 312-249.000.

Electronique Serge Dassault: *See—*
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Bousquet, Jacques; Catros, Alain; Huynh, Le Xuan; and Secq, Alain, 5,073,309, Cl. 261-29.000.

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Greene, Johathan W.; El Gamal, Abbas A.; and Kaptanoglu, Sinan, 5,073,729, Cl. 307-465.100.

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Knowlton, Barry R.; and Elgarhy, Yassin, 5,073,442, Cl. 428-267.000.

El Hadary, Khaled A. H. Fully adjustable articulator device. 5,073,109, Cl. 433-57.000.

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Lifer, Sherryl L.; Marshall, Winston S.; Mohamadi, Fariborz; Reel, Jon K.; Simon, Richard L.; Steinberg, Mitchell I.; and Whitesitt, Celia A., 5,073,566, Cl. 514-381.000.

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Friedman, Oswald; Elison, Hans-Dieter; and Jackel, Johann, 5,073,143, Cl. 464-68.000.

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Elliott, Raymond, to Imperial Chemical Industries PLC. Pyramidine derivatives. 5,073,187, Cl. 71-92.000.

Ellis-Brown, Roy, to Seafood Equipment Development Corporation. Shrimp cooking apparatus. 5,072,663, Cl. 99-331.000.

Ellison, Garry L.; and Sears, Kim W., to Root-Lowell Corporation. Elliptical tank portable garden sprayer. 5,072,884, Cl. 239-373.000.

Elmerick, Donald V.: *See—*
Peters, Richard K.; Elmerick, Donald V.; Spayer, James L.; and Walter, Gerald E., 5,073,857, Cl. 364-413.100.

Elsner, Frederick H.: *See—*
Raggio, William A.; Elsner, Frederick H.; and Woolf, Lawrence D., 5,073,240, Cl. 204-181.500.

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Takahashi, Yoshitaka; Koide, Hiroshi; Gotoh, Hiroshi; Emoto, Masami; and Honda, Syuichi, 5,073,888, Cl. 369-112.000.

Encaoua, Serge, to Societe d'Applications Generales d'Electricite et de Mecanique Sagem. Multichannel optical aiming and surveying method and apparatus having a field position spots correspondence table. 5,073,704, Cl. 250-201.100.

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Endo, Mamoru; and Hamatsu, Masahiro, to Clarion Co., Ltd. Communication device. 5,073,898, Cl. 375-1.000.

Endo, Syouji: *See—*
Otani, Susumu; and Endo, Syouji, 5,073,906, Cl. 375-116.000.

Endo, Yasuhiko: *See—*
Mimori, Takashi; Maeno, Hiroshi; Endo, Yasuhiko; and Morishita, Tomohiro, 5,073,178, Cl. 55-523.000.

Engel, Timothy S.: *See—*
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Engineered Data Products, Inc.: *See—*
Price, Macy J., Jr.; Ball, Laurence G.; and Johnson, Mack E., 5,072,835, Cl. 211-40.000.
Price, Macy J., Jr.; Johnson, Mack E.; and Starkey, Daniel C., 5,072,838, Cl. 211-162.000.

Engler, Bernd: *See—*
Domesle, Rainer; Engler, Bernd; Koberstein, Edgar; and Schubert, Peter, 5,073,532, Cl. 502-304.000.

Enloe, Jack H.; Lau, John W.; and Rice, Roy W., to W. R. Grace & Co.-Conn. Electronic package comprising aluminum nitride and aluminum nitride-borosilicate glass composite. 5,073,526, Cl. 501-96.000.

Ensor, David S.; and Sem, Gilmore J., to Research Triangle Institute. Measurement of ultrafine particle size distributions. 5,072,626, Cl. 73-865.500.

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Marron, Joseph C., 5,073,021, Cl. 351-168.000.

Epilady International Inc.: *See—*
Kantor, Isaak, 5,072,746, Cl. 132-219.000.

Epitope, Inc.: *See—*
Goldstein, Andrew S., 5,073,482, Cl. 435-5.000.

EQM Research, Inc.: *See—*
Eberly, James P.; and Magnotti, Ralph A., Jr., 5,073,029, Cl. 356-432.000.

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Hale, Roger W.; and Senk, Gerald B., Jr., 5,072,775, Cl. 164-186.000.

Eschwey, Manfred; van Bonn, Rolf; and Neumann, Horst, to MG Industries. Method for producing smooth surfaces on plastics. 5,073,231, Cl. 156-646.000.

Essef Corporation: *See—*
Wilkes, Robert D., 5,072,851, Cl. 220-366.000.

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Kaitandjian, Michel; Pradat, Philippe J.; Latouche-Halle, Jean P.; and Falipou, Alain M., 5,073,751, Cl. 320-1.000.

Ethyl Corporation: *See—*
Beltz, Mark W.; and Ramachandran, Venkataraman, 5,073,552, Cl. 549-214.000.
Klobucar, W. Dirk; and Kolich, Charles H., 5,073,284, Cl. 252-78.500.

Etoh, Yuko: *See—*
Nohira, Hiroyuki; Kamei, Masanao; Kanazawa, Hideki; Yamada, Yoko; and Etoh, Yuko, 5,073,306, Cl. 252-299.610.

Eugster, Giuliano: *See—*
Meier, Kurt; Eugster, Giuliano; Schwarzenbach, Franz; and Zweifel, Hans, 5,073,476, Cl. 430-280.000.

Eul, Wilfried: *See—*
Suess, Hans U.; and Eul, Wilfried, 5,073,301, Cl. 252-402.000.

Evans, David L., to Tucker Housewares. Newspaper bundler. 5,072,576, Cl. 53-592.000.

Evans, Samuel: *See—*
Schumacher, Rolf; Evans, Samuel; and Dubs, Paul, 5,073,278, Cl. 252-47.500.

Everhard, Kenneth D., to Aircraft Braking Systems Corporation. Telescopic brake piston. 5,072,811, Cl. 188-72.400.

Evers, Christian, to Siemens Aktiengesellschaft. Method for recognizing previously localized characters present in digital gray tone images, particularly for recognizing characters struck into metal surfaces. 5,073,955, Cl. 382-21.000.

Exer Icer Towels, Inc.: *See—*
Dibrell, Carroll M., 5,072,598, Cl. 62-259.300.

Express Marine, Inc.: *See—*
Kaucic, Robert, 5,072,685, Cl. 114-249.000.

Exxon Chemical Patents Inc.: *See—*
Gerri, Gustavo; and Michaelson, Robert C., 5,073,663, Cl. 585-668.000.
Saleh, Ramzi Y.; Soled, Stuart L.; and Dispenziere, Nicholas C., 5,073,658, Cl. 585-530.000.

Exxon Research and Engineering Co.: *See—*
Newlove, John C.; McDougall, Lee A.; Walker, John R.; and Stockwell, John R., 5,073,276, Cl. 252-8.551.

Eyraud, Marcel; and Grosjean, Pierre, to Rhone-Poulenc Chimie. Composite polyester films. 5,073,435, Cl. 428-215.000.

Fabri-Check, Inc.: *See—*
Smith, Barry W., 5,072,822, Cl. 198-349.000.

Fabricated Metals, Inc.: *See—*
Coleman, Clarence B., 5,072,857, Cl. 222-94.000.

Faccia, Tiziano. Drawing and conveying arm. 5,072,825, Cl. 198-513.000.

Fagundes, Carlos A.; McDermott, Thomas C., Jr.; and Colby, David M. Method and article for restraining extrusion of feed spacers and circumferential expansion in spiral filtration modules. 5,073,263, Cl. 210-321.830.

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Atwell, William A.; Domingues, David J.; Beckmann, Paul J.; Panama, Julio R.; and Fahrenholtz, Steven K., 5,073,392, Cl. 426-231.000.

Faircloth, Glynn T.: *See—*
Gunasekera, Sarath P.; Faircloth, Glynn T.; Wright, Amy E.; Thompson, Winnie C.; and Burres, Neal, 5,073,572, Cl. 514-739.000.

Falco, Rita J. Book mark and pen holder. 5,072,686, Cl. 116-234.000.

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Kaitandjian, Michel; Pradat, Philippe J.; Latouche-Halle, Jean P.; and Falipou, Alain M., 5,073,751, Cl. 320-1.000.

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Fanuc Ltd.: *See*—
Sakamoto, Keiji; and Iwashita, Yasusuke, 5,073,746, Cl. 318-560.000.

Fanucci, Jerome P.: *See*—
Koppernaes, Christian; Nolet, Stephen G.; and Fanucci, Jerome P., 5,073,413, Cl. 427-356.000.

FAR S.n.c. di Generali Giacomo: *See*—
Vincenzo, Cariati, 5,072,501, Cl. 29-243.525.

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Grange, John A.; and Faris, Sadeg M., 5,072,591, Cl. 62-50.700.

Farng, Liehpao O.; Horodysky, Andrew G.; and Murray, James G., to Mobil Oil Corporation. Sulfur coupled hydrocarbyl derived mercaptobenzothiazole adducts as multifunctional antiwear additives and compositions containing same. 5,073,279, Cl. 252-47.000.

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Stenglein, Paul R.; Farrell, Robert C.; and Derry, Michael A., 5,073,144, Cl. 464-111.000.

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Klimesch, Roger; Bleckmann, Gerhard; Farwerck, Karl-Peter; Schlemmer, Lothar; and Sanner, Axel, 5,073,379, Cl. 424-467.000.

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Faure, Jean-Francois; Nussbaum, Gilles; and Regazzoni, Gilles, to Pechiney Recherche. Process for obtaining magnesium alloys by spray deposition. 5,073,207, Cl. 148-2.000.

Federal Leasing Rehab Company: *See*—
Zacoi, Thomas N., 5,072,875, Cl. 128-400.000.

Fell, Helmut, to Medinorm Aktiengesellschaft medizintechnische Produkte. Device for aspirating wound fluids. 5,073,172, Cl. 604-119.000.

Felter, Richard E.: *See*—
Dees, Martin, Jr.; Felter, Richard E.; and Musser, Deborah L., 5,073,425, Cl. 428-48.000.

Ferco International Usine de Ferrures de Batiment: *See*—
Aumercier, Laurent, 5,072,489, Cl. 16-361.000.
Kautt, M. J., 5,072,495, Cl. 29-33.00K.

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Cavallaro, Raymond J.; and Ferrari, Edward, 5,072,668, Cl. 101-39.000.

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Butler, James R., 5,073,653, Cl. 585-449.000.

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Cergol, Maurizio, 5,072,681, Cl. 114-56.000.

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First Brands Corporation: *See*—
Leung, Pak S.; and Goddard, Errol D., 5,073,283, Cl. 252-78.500.

First Data Resources Inc.: *See*—
Katz, Ronald A., 5,073,929, Cl. 379-93.000.

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Stabel, Uwe; Gosch, Hans-Juergen; Fischer, Rolf; Harder, Wolfgang; and Hechler, Claus, 5,073,650, Cl. 568-864.000.

Fisher, Alan R.: *See*—
Garrett, Roy J.; and Fisher, Alan R., 5,073,156, Cl. 475-56.000.

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Parks, Stephen K.; and Fishman, Udi, 5,073,166, Cl. 609-93.000.

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Wu, Edwin S.; and Kover, Alexander, 5,073,560, Cl. 514-278.000.

Flexible S.r.l.: *See*—
Martinuzzo, Alberto, 5,073,431, Cl. 428-102.000.

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Flint, Graham W., to Martin Marietta Corporation. Cooled transmissive mirrors, beam splitters, windows, and refractive elements for high-power applications. 5,073,831, Cl. 359-845.000.

Florian, Roy S., to Nickson Industries, Inc. Catalytic converter front flange and method of making same. 5,073,353, Cl. 422-310.000.

Flux- Gerate GmbH: *See*—
Gschwender, Alois; Walther, Detlef; Kruger, Horst; and Pawlischta, Rudiger, 5,073,736, Cl. 310-88.000.

FMC Corporation: *See*—
Roush, David M.; Davis, Steven G.; Lutomski, Kathryn A.; Meier, Gary A.; Phillips, Richard B.; and Burkart, Susan E., 5,073,564, Cl. 514-365.000.

Fogal, Robert D. Method of balancing a vehicle wheel assembly. 5,073,217, Cl. 156-75.000.

Foley, Jeanne M.: *See*—
Turner, Deborah J.; Mehta, Arvind M.; Foley, Jeanne M.; and Doughty, Darrell G., 5,073,371, Cl. 424-401.000.
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Foltz, William E.: *See*—
Matner, Richard R.; Foltz, William E.; and Woodson, Lewis P., 5,073,488, Cl. 435-31.000.

Foon, Wilfred L.: *See*—
Mazloomdoost, Manoochehr; and Foon, Wilfred L., 5,072,726, Cl. 128-200.140.

Ford Motor Company: *See*—
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Garrett, Roy J.; and Fisher, Alan R., 5,073,156, Cl. 475-56.000.
Kennedy, John F., 5,073,976, Cl. 455-161.000.
Kostrzewski, Richard A., 5,072,948, Cl. 277-2.000.
Nawrocki, Ryszard, 5,072,615, Cl. 73-291.000.
Nietering, Kenneth E., 5,073,450, Cl. 428-336.000.

Forsythe, Richard H.: *See*—
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Fort Wayne Wire Die, Inc.: *See*—
Corbin, Lawrence W.; Carson, Charles; French, Jule L.; Bieberich, Dwight P.; and Bieberich, Donald E., 5,073,690, Cl. 219-69.120.

Forte, Paulino, to UOP. Method for aromatic hydrocarbon recovery. 5,073,669, Cl. 585-808.000.

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DelGuidice, Henry L.; Foster, George H., Jr.; and Warren, Michael G., 5,073,841, Cl. 361-428.000.

Foster, Gordon F.; Havewala, Noshir B.; and Shoup, Robert D., to Corning Incorporated. Method of protecting glass surfaces using submicron refractory particles. 5,073,181, Cl. 65-24.000.

Foster, L. Dale, to Hill-Rom Company, Inc. Hospital bed with pivoting headboard. 5,072,906, Cl. 248-122.000.

Foster Wheeler Energy Corporation: *See*—
Abdulally, Igbal F., 5,072,696, Cl. 122-4.00D.

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Hashimoto, Hiroshi; Ushimaru, Akira; and Murayama, Yuuichirou, 5,073,439, Cl. 428-328.000.
Hayashi, Yoichi, 5,073,951, Cl. 382-8.000.
Kato, Eiichi; and Ishii, Kazuo, 5,073,467, Cl. 430-87.000.
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Ikawa, Fumihiro, 5,073,774, Cl. 340-825.160.
Nishimura, Akira, 5,073,974, Cl. 455-103.000.
Shirasaki, Masataka, 5,073,331, Cl. 372-26.000.
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Fukuchi, Masakazu: *See*—
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Nakao, Yasushi; Fukuda, Mitsuhiro; and Yabuta, Motoshi, 5,073,602, Cl. 525-155.000.

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Herwander, David R., 5,073,204, Cl. 134-21.000.

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Yamada, Yukio; Furukawa, Akio; and Isono, Kazuki, 5,073,823, Cl. 358-209.000.

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Ikejiri, Kenichi; Kawahara, Eiichiro; and Furumoto, Mitsumasa, 5,072,587, Cl. 60-488.000.

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Furuya, Koichi: *See*—
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.

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Djuric, Stevan W.; Penning, Thomas D.; and Snyder, James P., 5,073,562, Cl. 514-365.000.
Marshall, Lucia G. I.; Patel, Kanaiyalal R.; and Roufa, Dikla G., 5,073,543, Cl. 514-21.000.

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Yip, Kit C., 5,072,662, Cl. 99-327.000.

G.S. Blodgett Co., Inc.: *See*—
Hullstrung, Jeffrey, 5,072,666, Cl. 99-468.000.

Gabriel, Claude D., to Bombardier Corporation. Knife switch. 5,073,686, Cl. 200-254.000.

Gagnon, Robert M.; and Carpenter, Daniel. Receptacle for foodstuffs and the like. 5,072,850, Cl. 220-300.000.

Gaier, James R., to United States of America, National Aeronautics and Space Administration. Method of intercalating large quantities of fibrous structures. 5,073,412, Cl. 427-294.000.

Galand, Claude, to International Business Machines Corporation. Process for varying speech speed and device for implementing said process. 5,073,938, Cl. 381-34.000.

Galaszewski, William: *See*—
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Gale, Robert P.: *See*—
Zeldis, Jerome B.; Gale, Robert P.; and Steinberg, Howard N., 5,073,481, Cl. 435-5.000.

Gallup, Darrell L.; and Jost, John W., to Union Oil Company of California. Use of reducing agents to control scale deposition from high temperature brine. 5,073,270, Cl. 210-698.000.

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Garcia, Tony R.: *See*—
Bruno, Richard C.; Freeto, Teresa M.; and Garcia, Tony R., 5,073,400, Cl. 426-639.000.

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Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 5,073,429, Cl. 428-71.000.

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Berion, Roland; and Garnier, Dominique, 5,073,032, Cl. 366-168.000.

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Gary, William L.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.

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Dec, Andrzej, 5,073,148, Cl. 474-94.000.

Gatschmann, Klaus G.; and Schutze, Gunter, to Efka-Werke Fritz Kiehn GmbH. Device for filling prefabricated cigarette tubes, especially filter tipped cigarette tubes. 5,072,740, Cl. 131-75.000.

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Golicz, Roman M., 5,072,921, Cl. 271-35.000.

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Chapoteau, Eddy; Czech, Bronislaw P.; Gebauer, Carl R.; Leong, Koon-Wah; and Kumar, Anand, 5,073,501, Cl. 436-74.000.

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Bencharab, Christian; Bonnet, Patrick; and Nithart, Henri, 5,073,679, Cl. 174-15.500.
Dupraz, Jean-Pierre; and Moncorge, Jean-Paul, 5,073,747, Cl. 318-561.000.

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Heyneker, Herbert L.; and Vehar, Gordon A., 5,073,494, Cl. 435-226.000.

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Raggio, William A.; Elsner, Frederick H.; and Woolf, Lawrence D., 5,073,240, Cl. 204-181.500.

General Automotive Specialty Co., Inc.: *See*—
Levine, Mark, 5,073,131, Cl. 439-621.000.

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Parekh, Ebrahim; Jensen, Jack E.; and Summers, Jeffrey L., 5,073,072, Cl. 411-354.000.

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Avakian, Roger W.; Parekh, Shashi L.; Shenian, Popkin; and Teutsch, Erich O., 5,073,416, Cl. 428-2.000.
Cole, Herbert S., Jr.; and Liu, Yung S., 5,073,814, Cl. 357-54.000.
Eberhard, Jeffrey W.; and Hedengren, Kristina H. V., 5,073,910, Cl. 378-4.000.
Hallgren, John E.; and Eddy, Victoria J., 5,073,605, Cl. 525-396.000.
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Taylor, Dale F., 5,073,336, Cl. 376-457.000.
Townsend, Harold E., 5,073,335, Cl. 376-373.000.
Viola, Jeffrey P.; and Sergi, Joseph B., 5,073,982, Cl. 359-120.000.
Zinser, Richard L.; Koch, Steven R.; and Toy, Raymond L., 5,073,940, Cl. 381-47.000.

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Humpston, Giles; and Jacobson, David M., 5,073,210, Cl. 148-11.50R.
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Genske, Roger P., to American National Can Company. Films using blends of polypropylene and polyisobutylene. 5,073,599, Cl. 525-240.000.

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Siegel, Neal A.; Tripp, Edward S.; Aunet, Diane L.; and Georgevich, Gradimir G., 5,073,216, Cl. 156-73.300.

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Schanz, Klaus; Martin, Roland; and Kaufmann, Bruno, 5,073,573, Cl. 514-844.000.

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Goda, Takuji; Nagayama, Hirotsugu; and Kawahara, Hideo, to Nippin Sheet Glass Co., Ltd. Method of depositing a silicon dioxide film. 5,073,408, Cl. 427-169.000.

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Godfrey, Christopher R. A.: *See*—
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Goldsmith, Paul F.: *See*—
Huguenin, G. Richard; Goldsmith, Paul F.; Deo, Naresh C.; and Walker, David K., 5,073,782, Cl. 342-179.000.

Goldstein, Andrew S., to Epitope, Inc. Elastic barrier permeability testing device and method of use. 5,073,482, Cl. 435-5.000.

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Wovkulich, Peter M.; Uskokovic, Milan R.; Goldstein, Ann; and McLane, John A., 5,073,568, Cl. 514-460.000.

Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Massey, Dennis W.; and Greig, Joseph R., to GT-Devices. High-pressure having plasma flow transverse to plasma discharge particularly for projectile acceleration. 5,072,647, Cl. 89-8.000.

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Schulz, Gerald O.; and Parker, Dane K., 5,073,592, Cl. 524-750.000.
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Green, James A.; and Hearn, Brian F. Method and system for receiving and distributing satellite transmitted television signals. 5,073,930, Cl. 380-10.000.
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Greene, Johathan W.; El Gamal, Abbas A.; and Kaptanoglu, Sinan, to Actel Corporation. Segmented routing architecture. 5,073,729, Cl. 307-465.100.
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Greve, Christopher G.; and O'Connor, Ronald M., to Laitram Corporation, The. Cutting apparatus for plastic conveyor modules. 5,072,640, Cl. 83-208.000.
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Gripe, William B.; and Cheng, Andrew Y., to Amot Controls, Inc. Fluid pressure operated indicating relay. 5,072,748, Cl. 137-102.000.
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Grogan, Richard P.: *See*—
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Grum-Schwensen, Jens C., to Dansk Industri Syndikat A/S. Press for pressing of molds. 5,072,777, Cl. 164-207.000.
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Aronne, Armand J., 5,072,457, Cl. 2-102.000.
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D'Onofrio, Enzo D., 5,073,700, Cl. 235-436.000.
Guarascio, Steve. Gas assisted scraper. 5,072,486, Cl. 15-401.000.
Gudgel, Robert C.; and Baker, William, to Motus Incorporated. Door hold open device. 5,072,973, Cl. 292-55.000.
Gueli, Francesco; and Prandoni, Mario, to OCN-PPL S.p.A. Tool-carrying slide for lathes. 5,072,636, Cl. 83-132.000.
Gugel, Bernd; and Ullrich, Matthias, to Mannesmann Aktiengesellschaft. Matrix pin print head having a shield to counter magnetic fields. 5,073,051, Cl. 400-124.000.
Guggiari, Andrea, to Pomini Farrel S.p.A. Die plate for extrusion, with discharge holes equipped with fitted inserts. 5,073,102, Cl. 425-461.000.
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Guinard, Maurice, to Electronique Serge Dassault. Mechano-optical device, in particular a rotary optical joint. 5,073,040, Cl. 385-26.000.
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Swanson, Melvin J.; and Guire, Patrick E., 5,073,484, Cl. 435-7.920.
Gumm, Linley F.; and Benedict, William, to Tektronix, Inc. In-service cable television measurements. 5,073,822, Cl. 358-139.000.
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Gupta, Raj K.; Kraft, Morton L.; and Coleman, William B., to TRW Vehicle Safety Systems, Inc. Treatment of azide containing waste. 5,073,273, Cl. 210-760.000.
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Guth, Jean-Louis: *See—*
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Guyon, Benoit P., to Societe Nationale d'Etude de Construction de Moteurs d'Aviation. Turbine vane with internal cooling circuit. 5,073,083, Cl. 415-115.000.

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Haacker, Heinz; Malik, J. Ernst; and Schmidt, Rainer, to MAN Gutehoffnungshutte Aktiengesellschaft. Mounting arrangement of a flow target plate of a fluidized-bed reactor. 5,072,754, Cl. 137-561.00A.

Haas, Anton: *See—*
Freymann, Raymond; Keck, Albrecht; and Haas, Anton, 5,072,801, Cl. 180-68.500.

Habrovansky, Josef; Boltnar, Vincenc; Rybka, Jiri ; Korvas, Albin; and Svajda, Jindrich, to Obuvnicky Prumsyl Svit. Lasting insole. 5,072,528, Cl. 36-43.000.

Haehne, Siegfried. Method for moulding objects and installations for carrying out the process. 5,072,772, Cl. 164-133.000.

Haerer, Juergen: *See—*
Seltmann, Hans-Guenter; Haerer, Juergen; and Hoffmann, Hans-Josef, 5,073,588, Cl. 524-264.000.

Hagans, Patrick L.: *See—*
DeKoven, Benjamin M.; and Hagans, Patrick L., 5,073,461, Cl. 428-698.000.

Hagensick, Thomas E., to Teradyne, Inc. Automatically testing telephone lines. 5,073,919, Cl. 379-29.000.

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Hagishita, Sanji; and Seno, Kaoru, to Shionogi & Co., Ltd. 4-(4-alkoxyphenyl)-2-butylamine derivative and process therefor. 5,073,648, Cl. 564-374.000.

Hagopian, Mark, to Biologics, Inc. Flotation therapy bed for preventing decubitus ulcers. 5,072,468, Cl. 5-451.000.

Hainbuch, Claus-Michael: *See—*
Kilian, Ulrich; Gotz, Jurgen; Hainbuch, Claus-Michael; and Edenhofer, Berthold, 5,072,803, Cl. 180-141.000.

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Leonard, Warren J.; Wolf, Julie B.; and Halden, Nancy F., 5,073,486, Cl. 435-19.000.

Hale, Amy P.: *See—*
Cheng, Jung-Jen A.; Martinez, Wilfred A.; and Hale, Amy P., 5,073,525, Cl. 501-81.000.

Hale, Arthur H.; and Blytas, George C., to Shell Oil Company. Alcohol-in-oil drilling fluid system. 5,072,794, Cl. 175-50.000.

Hale, Roger W.; and Senk, Gerald B., Jr., to Equipment Merchants International, Inc. Core blowing machine. 5,072,775, Cl. 164-186.000.

Hale, Thomas E., to Carboloy, Inc. Process for forming a surface oxidized binding layer on hard substrates. 5,073,411, Cl. 427-252.000.

Hall, Frank: *See—*
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Hall, William J.: *See—*
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Hallgren, John E.; and Eddy, Victoria J., to General Electric Company. Bromine-bisphenol reacted bisphenol and novolak epoxy resins with polyphenylene ether. 5,073,605, Cl. 525-396.000.

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Ham, Pierre; and de Bonneville, Jean, to Institut Francais du Petrole. Heat exchanger for heating the charge of a catalytic reforming unit operating under low pressure. 5,073,350, Cl. 422-190.000.

Hama, Masaaki; and Inoue, Junichirou, to Kubota Corporation. Hydraulically operable transmission. 5,072,814, Cl. 192-3.570.

Hamada, Yoshikazu; Ogino, Yozo; and Ashizawa, Katsuya, to Mitsui Kinzoku Kogyo Kabushiki Kaisha. Switch box of lock device for vehicle. 5,072,975, Cl. 292-201.000.

Hamada, Yosuke: *See—*
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Hamagishi, Yasutaro: *See—*
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 5,073,549, Cl. 514-183.000.

Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, to Eisai Co., Ltd. Process for the preparation of terpenes. 5,073,659, Cl. 585-600.000.

Hamano, Takafumi: *See—*
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, 5,072,526, Cl. 34-60.000.

Hamatsu, Masahiro: *See—*
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Hamaue, Tetsuya, to Takata Corporation. Seat belt system with tensionless function and acceleration sensor. 5,072,968, Cl. 280-806.000.

Hamilton, Harold J., to Censtor Corp. Method of making integrated magnetic read/write head/flexure/conductor structure. 5,073,242, Cl. 204-192.220.

Hammond, John A.; and Trunzo, Angelo J., to Frazier-Simplex, Inc. Hydraulically operated blanket batch charger. 5,073,183, Cl. 65-335.000.

Hanazono, Masanobu: *See—*
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Haneda, Satoshi; Fukuchi, Masakazu; Matsuo, Shunji; and Morita, Shizuo, to Konica Corporation. Color image forming apparatus having different ejection parts for different paper thickness. 5,073,801, Cl. 355-311.000.

Hanel, Albert L.: *See—*
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Hans, Waldemar; and Bensch, Guenther, to Robert Bosch GmbH. Valve needle and method for producing a valve needle. 5,072,885, Cl. 239-466.000.

Hansen, David; and Mahoney, Patrick F., to EAC Systems, Inc. Method of collecting recyclable materials. 5,072,833, Cl. 209-3.300.

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Hanson, Richard A. Pendulous assembly including specifically configured mounting pads. 5,072,619, Cl. 73-517.00B.

Hara, Yasushi; Suzuki, Nobumasa; Ito, Yukio; and Sekizawa, Kazuhiko, to Tosoh Corporation. Process for producing a polyalkylene polyamine. 5,073,649, Cl. 564-479.000.

Harada, Takashi: *See—*
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Harelstad, Wayne, to Fremont Industries, Inc. Coating remover and paint stripper containing N-methyl-2-pyrrolidone, methanol, and sodium methoxide. 5,073,287, Cl. 252-153.000.

Hargreaves, William R., to Biotope, Inc. Devices for conducting specific binding assays. 5,073,341, Cl. 422-58.000.

Harjunmaa, Hannu: *See—*
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Harmening, Michael: *See—*
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Harrison, Daniel J.; Weber, Helmut; and Yacobucci, Paul D., to Eastman Kodak Company. Color filter array element with polyester receiving layer. 5,073,534, Cl. 503-227.000.

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Harshman, Daniel L., to General Electric Company. Scramjet combustor. 5,072,581, Cl. 60-270.100.

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Hartmann, Heinrich: *See—*
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Hasegawa, Ryuichi: *See—*
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Hashiguchi, Osamu; Tayama, Yukiharu; and Yamamura, Shigeharu, to Japan Aviation Electronics Industry, Limited; and NEC Corporation. Electrical connector comprising an intermediate connection element for connecting and disconnecting between a first and second connection element. 5,073,125, Cl. 439-310.000.

Hashimoto Chemical Industries Co., Ltd.: *See—*
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Hashimoto, Hiroshi; Ushimaru, Akira; and Murayama, Yuuichirou, to Fuji Photo Film Co., Ltd. Magnetic recording medium comprising a vinyl chloride based resin group containing an epoxy group or a polar or both and further a polyurethane resin containing three hydroxyl groups and one polar group. 5,073,439, Cl. 428-328.000.

Hashimoto, Kouzi: *See—*
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Hattori, Seiji: *See—*
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Hayase, Masahiro: *See—*
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Hayashi, Yoichi, to Fuji Photo Film Co., Ltd. Method of inspecting an adhesive to fasten a center hub to a magnetic disk. 5,073,951, Cl. 382-8.000.

Hayes, Norris O.: *See—*
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Hayman, Lowell K., to United States of America, Air Force. Prefabricated modular storage building. 5,072,554, Cl. 52-79.100.

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Haynes, William M.: *See—*
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Hays, Eric L., to Square D Company. Transformer core and method for stacking the core. 5,073,766, Cl. 336-217.000.

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Hearn, Brian F.: *See—*
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Hechler, Claus: *See—*
Stabel, Uwe; Gosch, Hans-Juergen; Fischer, Rolf; Harder, Wolfgang; and Hechler, Claus, 5,073,650, Cl. 568-864.000.

Hedengren, Kristina H. V.: *See—*
Eberhard, Jeffrey W.; and Hedengren, Kristina H. V., 5,073,910, Cl. 378-4.000.

Hedgcoth, Virgle L. Slotted cylindrical hollow cathode/magnetron sputtering device. 5,073,245, Cl. 204-298.210.

Heffner, Thomas G.: *See—*
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 5,073,561, Cl. 514-357.000.

Heibel, Helmut; and Gilles, Leo, to Lucas Industries public limited company. Brake actuating assembly for motor vehicles. 5,072,996, Cl. 303-114.000.

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Beisenherz, Kurt; and Knodel, Waldemar R., 5,073,254, Cl. 209-273.000.

Heinz, Doepgen; Gerhard, Winkelmann; and Vermeulen, Jean. System for rolling advertising posters. 5,072,533, Cl. 40-518.000.

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Heitz, Walter-Helmut. Device for slitting and curling ornamental packaging ribbons. 5,072,515, Cl. 30-304.000.

Helbling, Edward. Automatic infusion-beverage apparatus. 5,072,660, Cl. 99-280.000.

Helis: *See—*
Line, Henri, 5,073,069, Cl. 409-197.000.

Hellstrom, Ake A., to ABB Process Automation, Inc. Light scanner web profile measurement apparatus and method. 5,073,712, Cl. 250-252.100.

Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., to Ciba-Geigy Corporation; and Pennsylvania Research Corporation. The. Herbicidal tolerant plants containing rat glutathione S-transferase gene. 5,073,677, Cl. 800-205.000.

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Luke, John A.; Case, Paul D.; and Hemsley, Stephen R., 5,072,744, Cl. 131-375.000.

Hendershot, John A., to World Enviro Systems, Inc. Double bladder fluid containment system. 5,072,623, Cl. 73-49.200.

Henderson, Brian, to Medical Laser Technologies Limited of Research Park. Method of making an optical device. 5,073,402, Cl. 427-2.000.

Hendley, Nass: *See—*
Thrift, Jimmie R.; and Hendley, Nass, 5,072,914, Cl. 254-100.000.

Hendricks, William G.; and Eimer, Richard A., to Tackle Tamer Products, Inc. Skimmer with pivoted strainer portions. 5,072,538, Cl. 43-4.000.

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Wonder, Terry M.; Sorenson, Joseph T.; Hendry, Garlyn W.; and Neer, Lawrence A., 5,072,738, Cl. 128-888.000.

Henkel Corporation: *See—*
Fotinos, Nicephoros A.; and Kent, Gary D., 5,073,196, Cl. 106-287.190.

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Seltmann, Hans-Guenter; Haerer, Juergen; and Hoffmann, Hans-Josef, 5,073,588, Cl. 524-264.000.

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Henne, John R., to Stanley Works, The. Push to close latch for self-cleaning oven. 5,072,974, Cl. 292-126.000.

Herbrechtsmeier, Peter: *See—*
Coutandin, Jochen; Groh, Werner; Herbrechtsmeier, Peter; and Theis, Jurgen, 5,073,314, Cl. 264-1.500.

Herbst, Joseph A.; Markham, Catherine L.; Sapre, Ajit V.; and Teitman, Gerald J., to Mobil Oil Corporation. High efficiency catalytic cracking stripping apparatus. 5,073,349, Cl. 422-144.000.

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Ahmed, Syed M., 5,073,282, Cl. 252-77.000.
Shannon, Paul J.; Sun, Shao-Tang; and Swetlin, Brian J., 5,073,294, Cl. 252-299.010.

Hergeth Hollingsworth GmbH: *See—*
Pinto, Akiva; Lucassen, Guenter; and Bocht, Bernhard, 5,072,491, Cl. 19-145.500.

Herman, Allen M.: *See—*
Sheng, Zhengzhi; and Herman, Allen M., 5,073,536, Cl. 505-1.000.

Hernandez, Elio: *See—*
Dobbs, Douglas B.; Grogan, Richard P.; and Hernandez, Elio, 5,072,860, Cl. 222-383.000.

Herscovici, Saul, to Power Engineering & Manufacturing, Ltd. Mechanically variable transmission. 5,073,157, Cl. 475-211.000.

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Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., 5,073,091, Cl. 60-222.00R.

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Herwander, David R., to Fuller Austin Insulation Inc. Hot removal process for asbestos insulation. 5,073,204, Cl. 134-21.000.

Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, to Robert Bosch GmbH. Shaft stop bushing. 5,073,071, Cl. 411-353.000.

Herzig, Albert M. Impaired curved semi-rigid plastic rib closure for flexible containers. 5,072,855, Cl. 222-39.000.

Hesler, Grace A.: *See—*
Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,073,633, Cl. 540-545.000.

Hessel, John F.; Aronson, Michael P.; Cardinali, Martin S.; and Kaiserman, Howard B., to Lever Brothers Company, Division of Conopco, Inc. Heavy duty liquid detergent compositions containing enzymes stabilized by quaternary nitrogen substituted proteins. 5,073,292, Cl. 252-174.120.

Hesterman, Victor W.: *See—*
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Hetzler, Steven R.: *See—*
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Peterson, Stephen S.; Blawd, Harold C.; Heutmaker, Michael E.; Engel, Timothy S.; and Iverson, Robert A., 5,072,929, Cl. 272-72.000.

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Gill, Hardayal S.; and Hesterman, Victor W., 5,073,836, Cl. 360-113.000.
Morrison, Robert D., 5,073,968, Cl. 395-500.000.

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Fliegel, Frederick M.; Cho, Frederick Y.; and Hickernell, Fred S., 5,073,807, Cl. 357-24.000.

Higa, Teruo, to AKWN Xo., Ltd.; and Ryoko Co., Ltd. Apparatus for treating water. 5,073,257, Cl. 210-170.000.
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Kato, Tomokazu; Maruta, Syuzi; Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, 5,073,803, Cl. 355-324.000.
Highland Supply Corporation: *See*—
Weder, Andrew, 5,072,460, Cl. 2-206.000.
Weder, Donald E.; Straeter, Joseph G.; and Craig, Frank J., 5,073,161, Cl. 493-154.000.
Hijikata, Akira: *See*—
Yanagimoto, Kazuhiro; and Hijikata, Akira, 5,072,985, Cl. 296-76.000.
Hileman, Ronald A.: *See*—
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Hill, David: *See*—
Littleproud, Antony; and Hill, David, 5,072,950, Cl. 277-9.500.
Hill-Rom Company, Inc.: *See*—
Foster, L. Dale, 5,072,906, Cl. 248-122.000.
Hill, Ronald C.; Eckert, Richard M.; and Marzullo, Anthony, to Strippit, Inc. Stamping tool. 5,072,620, Cl. 72-414.000.
Hill, Terrance: *See*—
Dapper, Mark; and Hill, Terrance, 5,073,905, Cl. 375-106.000.
Hinks, Raymond W., to Terratech Mining Services (PTY) Ltd. Pressure balanced mechanical seal assembly with encapsulated double-disk spring biassing element. 5,072,951, Cl. 277-40.000.
Hintzen, Ullrich: *See*—
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Hinzen, Dieter: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 5,073,671, Cl. 548-348.000.
Hioki, Katsuyuki: *See*—
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Hirabayashi, Kazuo; Kondoh, Tadami; Nishijima, Hiroaki; Inoue, Shinichi; Adachi, Kouji; Igarashi, Fumiho; and Wakai, Toshio, to Research Association for the Utilization of Light Oil. Process for the production of high-octane gasoline blending stock. 5,073,673, Cl. 585-415.000.
Hirai, Hiromu: *See*—
Kobayashi, Isao; Hamada, Yosuke; Mori, Kenji; and Hirai, Hiromu, 5,073,912, Cl. 378-34.000.
Hiraki, Yasuhito: *See*—
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Hiraoka, Mizuho: *See*—
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Hirasa, Yoshiaki, to Mazda Motor Corporation. Audio system for automotive vehicles. 5,073,944, Cl. 381-86.000.
Hiratsuka, Ryuichi: *See*—
Uematsu, Masahiro; Hiratsuka, Ryuichi; and Kato, Kazuro, 5,073,783, Cl. 342-359.000.
Hirayama, Masayoshi: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.
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Hirose Electric Co., Ltd.: *See*—
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Hirota, Ken; Satomi, Mitsuo; and Kugimiya, Koichi, to Matsushita Electric Industrial Co., Ltd. Magnetic material for a magnetic head. 5,073,214, Cl. 148-306.000.
Hirota, Minoru; Kuse, Kazuki; and Keyaki, Keiichi, to Yoshida Kogyo K. K. Method and apparatus for applying slide fastener end stop. 5,072,502, Cl. 29-408.000.
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, to Sanyo Electric Co., Ltd. Clothes dryer. 5,072,526, Cl. 34-60.000.
Hirst, Roy T., to Rolls-Royce plc. Single-price labyrinth seal structure. 5,073,084, Cl. 415-209.300.
Hirukawa, Itsushi; and Ito, Ryoichi, to Sanshin Kogyo Kabushiki Kaisha. Shift assisting system. 5,072,629, Cl. 74-851.000.
Hisamura, Makoto: *See*—
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Hisanaga, Tetsuo, to Yamatake-Honeywell Co., Ltd. Temperature compensating circuit. 5,072,614, Cl. 73-204.190.
Hisatake, Yoshihiro: *See*—
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Hisatomi, Shinichi: *See*—
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Hitachi Chemical Company, Ltd.: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.
Hitachi Computer Engineering Co., Ltd.: *See*—
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Hitachi, Ltd.: *See*—
Aoyama, Tamoo; Inagami, Yasuhiro; and Nurayama, Hiroshi, 5,073,970, Cl. 395-800.000.
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Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.
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Maeda, Takeshi; and Tsunoda, Yoshito, 5,073,880, Cl. 369-32.000.
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Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.
Nakamura, Shigeki; and Takahashi, Yasufumi, 5,073,904, Cl. 375-94.000.
Owada, Nobuo; Yamaguchi, Hizuru; Ozono, Sekiko; and Yasuda, Atsumi, 5,073,810, Cl. 357-34.000.
Sakamura, Ken; Hashimoto, Kouzi; Kawasaki, Ikuya; Hasegawa, Atsushi; and Iwasaki, Kazuhiko, 5,073,856, Cl. 395-375.000.
Satta, Masayuki; Takanashi, Katsuya; and Yanagi, Kunihiro, 5,073,771, Cl. 340-721.000.
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.
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Hitachi, Ltd: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.
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Niimi, Hideaki; Isoe, Noboru; Wakai, Kunio; and Mizumura, Tetsuo, 5,073,449, Cl. 428-336.000.
Hitachi Maxwell, Ltd: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.
Hitachi Metals, Ltd.: *See*—
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Hitachi Microcomputer System, Inc.: *See*—
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Hitani, Tomoki: *See*—
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Hitec Co., Ltd.: *See*—
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Hiyama, Isao: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.
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Ho, John K. H.: *See*—
Chakravarty, Abhijit J. M.; Cooper, Steven R.; Ho, John K. H.; and Tran, Chuong B., 5,072,893, Cl. 244-76.00R.
Hochman, Lana: *See*—
Pan, Yuh-Guo; Chan, Alexander; and Hochman, Lana, 5,073,173, Cl. 8-405.000.
Hockaday, Bruce D. Self aligning pigtail. 5,073,002, Cl. 385-49.000.
Hodges, Robert C.: *See*—
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Hoechst Aktiengesellschaft: *See*—
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Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,073,579, Cl. 524-255.000.
Raab, Klaus, 5,073,651, Cl. 870-170.000.

Robeck, Horst; Deger, Hans-Matthias; and Raab, Klaus, 5,073,291, Cl. 252-171.000.
Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,073,185, Cl. 71-091.000.
Wojtech, Bernhard; Niederstaetter, Walter; and Thamm, Horst-Dieter, 5,073,622, Cl. 528-486.000.

Hoff, Edwin F., Jr.: *See*—
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and Lefiles, James H., 5,073,191, Cl. 71-121.000.

Hoffman, Charles R., to International Business Machines Corporation. Current transient reduction for VLSI chips. 5,073,730, Cl. 307-480.000.

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Familletti, Philip C., 5,073,491, Cl. 435-240.220.

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Hoffmann-La Roche Inc.: *See*—
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Wovkulich, Peter M.; Uskokovic, Milan R.; Goldstein, Ann; and McLane, John A., 5,073,568, Cl. 514-460.000.

Hofmann, Karl: *See*—
Eblen, Ewald; Hofmann, Karl; Schmitt, Alfred; Straubel, Max; and Truong-Canh, Hung, 5,072,706, Cl. 123-297.000.

Hofmann, Ruediger, to Siemens Aktiengesellschaft. Broadband signal switching equipment. 5,073,775, Cl. 340-825.790.

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Hogenson, Raymond A., to Minnesota Mining and Manufacturing Company. Apparatus for retaining a two-piece connector for attachment to a flat multiconductor electrical cable. 5,072,517, Cl. 29-749.000.

Holdredge, Susan S.: *See*—
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Holdredge, Terry K.; and Holdredge, Susan S. Convertible visual display device. 5,073,825, Cl. 358-254.000.

Holeva, Kenneth T.; and Gounaris, Michael C., to Richardson-Vicks, Inc. Denture stabilizing compositions. 5,073,604, Cl. 525-327.800.

Holland, John C.; and Coppedge, Joe L., Sr. Mechanic's helper and step platform. 5,072,955, Cl. 280-32.500.

Hollister Incorporated: *See*—
Schneider, Barry L., 5,073,170, Cl. 604-180.000.

Hollister, William H.; Bell, Craig J.; and Carruthers, Cary D. Suction catheter. 5,073,164, Cl. 604-43.000.

Holmes, Thomas F.; Johnson, Rick; and Lenhart, Brian P., Jr., to Motorola, Inc. Selective call receiver theft protection device. 5,073,767, Cl. 340-311.100.

Holo-Or Ltd.: *See*—
Kedmi, Joseph; and Grossinger, Israel, 5,073,007, Cl. 359-565.000.

Hommes, William J.; and Keegan, John J., Jr., to Du Pont de Nemours, E. I., and Company. Apparatus for drawing plastic film in a tenter frame. 5,072,493, Cl. 26-72.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
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Ikejiri, Kenichi; Kawahara, Eiichiro; and Furumoto, Mitsumasa, 5,072,587, Cl. 60-488.000.
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Honda, Syuichi: *See*—
Takahashi, Yoshitaka; Koide, Hiroshi; Gotoh, Hiroshi; Emoto, Masami; and Honda, Syuichi, 5,073,888, Cl. 369-112.000.

Honda, Toshiro: *See*—
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Honeywell Inc.: *See*—
Kompelien, Arlon D., 5,073,769, Cl. 340-578.000.

Hong, Shane Y.: *See*—
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Honma, Takeo: *See*—
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Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

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Horikawa, Osamu; Harada, Takashi; and Ikeshima, Koichi, to NGK Insulators, Ltd. Honeycomb structure and method of producing the same. 5,073,432, Cl. 428-116.000.

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Hornauer, Klaus-Peter: *See*—
Koehler, Winfried; Hornauer, Klaus-Peter; Kopp, Reiner; Baldner, Klaus; and Wuestefeld, Frank, 5,072,606, Cl. 72-53.000.

Horner, Joseph L.; and Makekau, Charles K., to United States of America, Air Force. Compact 2f optical correlator. 5,073,006, Cl. 359-561.000.

Hornig, Wolfgang, to Prodenta AG. Method of manufacturing metallic tooth parts. 5,073,113, Cl. 433-223.000.

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Farng, Liehpao O.; Horodysky, Andrew G.; and Murray, James G., 5,073,279, Cl. 252-47.000.

Hoshi, Satoshi: *See*—
Makino, Naonori; Hoshi, Satoshi; Ohno, Shigeru; and Kitatani, Katsuji, 5,073,465, Cl. 430-58.000.

Hosiden Corporation: *See*—
Nakamura, Masahiko, 5,073,130, Cl. 439-607.000.

Hosoya, Nobukazu: *See*—
Sasaki, Tooru; and Hosoya, Nobukazu, 5,073,886, Cl. 369-60.000.

Howell, William M. Teaching - photographic tank. 5,073,115, Cl. 434-297.000.

Hoya Corporation: *See*—
Futamura, Hideyuki; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,073,616, Cl. 526-264.000.

Hrncir, Robert E.: *See*—
Taylor, Carl A.; and Hrncir, Robert E., 5,072,618, Cl. 73-317.000.

Hseng Chee Enterprise PTE, Ltd: *See*—
Liao, Ching-Fu, 5,073,103, Cl. 425-545.000.

Huang, Tzu-Ping. Adjustable cup holder in the car. 5,072,909, Cl. 248-311.200.

Huang, Tzuli J., to Minnesota Mining and Manufacturing Company. Silica coating composition for reflective sheeting. 5,073,404, Cl. 427-39.000.

Hubben, Edward B.; and Marcou, Jean-Claude, to Pass & Seymour, Inc. Two-piece wall plate for electrical device. 5,073,681, Cl. 174-66.000.

Hubbs Machine & Manufacturing: *See*—
Hubbs, William O., 5,073,005, Cl. 359-515.000.

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Hudson, Douglas F., Jr.: *See*—
Crick, Dallas M.; Perkins, James G.; and Hudson, Douglas F., Jr., 5,072,562, Cl. 52-533.000.

Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, to BASF Aktiengesellschaft. Cycloalkylidene derivatives and fragrance composition. 5,073,538, Cl. 512-9.000.

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Anderson, Edward A.; Sandi, Ernesto S.; and White, Mary K., 5,073,683, Cl. 174-117.0FF.

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Hung, Liang-Sun; and Chatterjee, Dilip K., to Eastman Kodak Company. Electrically conductive article. 5,073,537, Cl. 505-1.000.

Hunt, Sean P. Beach towel with pockets. 5,072,467, Cl. 5-417.000.

Hunter Douglas International N.V.: *See*—
Blaauw, Kasper, 5,073,426, Cl. 428-56.000.

Huppe, Dennis P. Bicycle with universal adjustable frame. 5,072,961, Cl. 280-278.000.

Hurley, Dale P., to Swing Right Manufacturing Inc. Golf swing training device. 5,072,942, Cl. 273-191.00A.

Huser, Peter, to E C.H. Will GmbH. Apparatus for severing and dedusting webs of paper or the like. 5,072,638, Cl. 83-24.000.

Husky Injection Molding Systems Ltd.: *See*—
Schad, Robert D.; and Brown, Paul, 5,073,328, Cl. 264-297.200.

Huss, Albin, Jr.: *See*—
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, 5,073,665, Cl. 585-722.000.

Huynh, Le Xuan: *See*—
Bousquet, Jacques; Catros, Alain; Huynh, Le Xuan; and Secq, Alain, 5,073,309, Cl. 261-29.000.

Hwo, Charles C.; and Watkins, Larry K., to Shell Oil Company. Polypropylene-polybutylene laminated packaging film with improved tear strength. 5,073,458, Cl. 428-516.000.

Hyatt, Robert G. Wrist and forearm support apparatus. 5,072,905, Cl. 248-118.000.

HYDAC Filtertechnik GmbH: *See*—
Wilkendorf, Werner, 5,073,260, Cl. 210-238.000.

Hydromatik GmbH: *See*—
Adler, Bernhard, 5,072,655, Cl. 92-160.000.

Hyogo, Mitsushi: *See*—
Ogawa, Keikitsu; Takeda Sunoa; Hyogo, Mitsushi; and Shindo, yoshiaki, 5,072,736, Cl. 128-680.000.
HYPRES Incorporated: *See*—
Grange, John A.; and Faris, Sadeg M., 5,072,591, Cl. 62-50.700.
Hyuga, Takehiro: *See*—
Matsumoto, Kazutoshi; Hyuga, Takehiro; and Mukai, Tetsuya, 5,073,528, Cl. 501-134.000.
Hyundai Electronics Industries Co., Ltd.: *See*—
Oh, Jong H., 5,073,731, Cl. 307-482.000.
Ichikawa, Hiroaki: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.
Ichinose, Makoto: *See*—
Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, 5,073,887, Cl. 369-100.000.
ICI Americas Inc.: *See*—
Michaely, William J.; and Curtis, Jeff K., 5,073,642, Cl. 560-18.000.
Idei, Yasuo, to Kabushiki Kaisha Toshiba. Semiconductor light emitting element with grooves. 5,073,806, Cl. 357-17.000.
Idemitsu Petrochemical Co., Ltd.: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.
Idota, Yoshio: *See*—
Koya, Keizo; and Idota, Yoshio, 5,073,473, Cl. 430-247.000.
Igarashi, Fumiho: *See*—
Hirabayashi, Kazuo; Kondoh, Tadami; Nishijima, Hiroaki; Inoue, Shinichi; Adachi, Kouji; Igarashi, Fumiho; and Wakai, Toshio, 5,073,673, Cl. 585-415.000.
Igari, Akihide; and Nakagawa, Zenbee, to Somar Corporation. Varistor material and process for production therefor. 5,073,302, Cl. 252-518.000.
Iida, Tetsuya, to Minolta Camera Kabushiki Kaisha. Method for processing color image and apparatus therefor. 5,073,818, Cl. 358-80.000.
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, to Central Glass Company, Limited. Heat insulating glass with dielectric multilayer coating. 5,073,451, Cl. 428-336.000.
Iijima, Tamotsu; and Sano, Kazuhide, to Nisca Corporation. Vibration-coupling type ultrasonic actuator and method for operating the same. 5,073,739, Cl. 310-323.000.
Iinuma, Tomohisa; Yamamoto, Noriyuki; and Kato, Hideki, to Toagosei Chemical Industry Co., Ltd. Epoxy resin composition for use in sealing semiconductors. 5,073,580, Cl. 523-442.000.
Ikawa, Fumihiro, to Fujitsu Limited. One-to-one switching system. 5,073,774, Cl. 340-825.160.
Ikeda, Kazufumi: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.
Ikeda, Nobuo. Apparatus for impregnating wood including monitor unit. 5,072,692, Cl. 118-713.000.
Ikeda, Yukio: *See*—
Saito, Takayuki; Nakajima, Ken; Iwase, Yoki; Ikeda, Yukio; and Shima, Hiroyuki, 5,073,268, Cl. 210-638.000.
Ikejiri, Kenichi; Kawahara, Eiichiro; and Furumoto, Mitsumasa, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulically operated continuously variable transmission. 5,072,587, Cl. 60-488.000.
Ikeshima, Koichi: *See*—
Horikawa, Osamu; Harada, Takashi; and Ikeshima, Koichi, 5,073,432, Cl. 428-116.000.
Ikuo Yamashina: *See*—
Yamashina, Ikuo, 5,073,493, Cl. 435-240.270.
Ilford AG: *See*—
Reber, Jean F., 5,073,479, Cl. 430-569.000.
Ilg, Bernd: *See*—
Fassbender, Rolf; and Ilg, Bernd, 5,072,585, Cl. 60-384.000.
Illinois Tool Works Inc.: *See*—
Marco, Leslie S.; and Olsen, Robert, 5,072,829, Cl. 206-162.000.
Imagawa, Katsuhiko, to Yamaha Corporation. Reinforced sound board used in musical instrument. 5,072,642, Cl. 84-193.000.
Imai, Toshitaka: *See*—
Fujimoto, Sachito; and Imai, Toshitaka, 5,072,631, Cl. 74-860.000.
Imaizumi, Tomio, to Tokico Ltd. Hydraulic shock absorber. 5,072,812, Cl. 188-282.000.
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, to Canon Kabushiki Kaisha. Information recording medium, production process and molding die for substrate therefor. 5,073,101, Cl. 425-385.000.
Imazu, Katsuhiro; Aizawa, Masanori; Miyazawa, Tetsuo; Satoh, Nobuyuki; and Kobayashi, Seishichi, to Toyo Seikan Kaisha Ltd. Process for production of covered deep-drawn can. 5,072,605, Cl. 72-46.000.
Imme, Martin W., to U.S. Philips Corporation. Method of detecting edges in images. 5,073,958, Cl. 382-22.000.
Immonen, Pasi H.; and Kohonen, Raimo O., to A. Ahlstrom Corporation. Apparatus for treating fiber suspension. 5,073,264, Cl. 210-404.000.
Immunex Corporation: *See*—
Curtis, Benson M.; Park, Linda S.; and Cosman, David J., 5,073,627, Cl. 530-351.000.
Imperial Chemical Industries PLC: *See*—
Anthony, Vivienne M.; Clough, John M.; deFraine, Paul; Godfrey, Christopher R. A.; and Beautement, Kevin, 5,073,184, Cl. 71-90.000.
Bridges, Ian G.; Schuch, Wolfgang W.; and Grierson, Donald, 5,073,676, Cl. 800-205.000.
Elliott, Raymond, 5,073,187, Cl. 71-92.000.
Taylor, Stephen C., 5,073,640, Cl. 560-254.000.
Implant Plastics Corporation: *See*—
Barbone, Noram K., 5,073,110, Cl. 433-173.000.
Inaba, Hiroo: *See*—
Takahashi, Masatoshi; Inaba, Hiroo; and Taga, Kazuaki, 5,073,406, Cl. 427-131.000.
Inagami, Yasuhiro: *See*—
Aoyama, Tamoo; Inagami, Yasuhiro; and Nurayama, Hiroshi, 5,073,970, Cl. 395-800.000.
Inagawa, Hideho; and Nojo, Shigenobu, to Canon Kabushiki Kaisha. Method and apparatus for working print board by laser. 5,073,687, Cl. 219-121.700.
Inami, Takashi: *See*—
Takafuji, Yutaka; Inami, Takashi; and Atarashi, Hisashi, 5,073,772, Cl. 340-784.000.
Inax Corporation: *See*—
Saito, Shiro; Shirai, Kenji; Kawamoto, Ryuichi; and Sakakibara, Shigeru, 5,073,500, Cl. 436-53.000.
INCO Limited: *See*—
Ouig, Gary F., 5,073,252, Cl. 209-139.100.
Ingle, David M., to Union Oil Company of California. Mastic and caulking compositions and composite articles. 5,073,445, Cl. 428-314.400.
Inmos Limited: *See*—
Wakefield, Elwyn P. M.; and Walker, Christopher P. H., 5,073,816, Cl. 357-74.000.
Innerspace Corporation: *See*—
Gongwer, Calvin A., 5,072,579, Cl. 60-221.000.
Inoue, Junichirou: *See*—
Hama, Masaaki; and Inoue, Junichirou, 5,072,814, Cl. 192-3.570.
Inoue, Seiji, to Sanshin Kogyo Kabushiki Kaisha. Fuel supplying system for engine of outboard motor. 5,073,133, Cl. 440-1.000.
Inoue, Shinichi: *See*—
Hirabayashi, Kazuo; Kondoh, Tadami; Nishijima, Hiroaki; Inoue, Shinichi; Adachi, Kouji; Igarashi, Fumiho; and Wakai, Toshio, 5,073,673, Cl. 585-415.000.
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, to Mitsubishi Petrochemical Co., Ltd. Polyphenylene ether resin composition. 5,073,596, Cl. 525-92.000.
Inoue, Teruhiko: *See*—
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, 5,073,556, Cl. 514-254.000.
Inoue, Yoshio: *See*—
Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, 5,073,725, Cl. 307-427.000.
Institut Francais du Petrole: *See*—
Dang Vu, Quang; Bournonville, Jean-Paul; Mank, Larry; and Viltard, Jean-Charles, 5,073,352, Cl. 422-213.000.
Ham, Pierre; and de Bonneville, Jean, 5,073,350, Cl. 422-190.000.
Petit, Laurent; Bournonville, Jean-Paul; Guth, Jean-Louis; Raatz, Francis; and Seive, Alain, 5,073,672, Cl. 585-415.000.
Institut National de la Recherche Agronomique: *See*—
Adda, Jacques; and Lorne, Jean-Luc, 5,073,267, Cl. 210-634.000.
Institut Pasteur: *See*—
Babinet, Charles; and Morello, Dominique, 5,073,490, Cl. 435-240.200.
Intel Corporation: *See*—
Patel, Piyush G., 5,073,891, Cl. 371-21.300.
Shoemaker, Kenneth D., 5,073,969, Cl. 395-725.000.
Intelmatec Corporation: *See*—
Akagawa, Minoru, 5,073,079, Cl. 414-416.000.
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Wanhem, Jean-Pierre; and Guillo, Benoit, 5,073,332, Cl. 376-249.000.
International Business Machines Corporation: *See*—
Best, John S.; and Wang, Po-Kang, 5,073,833, Cl. 360-77.050.
Best, John S.; Hetzler, Steven R.; Kabelac, William J.; and Thompson, David A., 5,073,834, Cl. 360-77.080.
Califano, Andrea, 5,073,962, Cl. 382-27.000.
Farooq, Shaji; Natarajan, Govindarajan; Reddy, Srinivasa S. N.; Shelleman, Richard A.; Stoffel, Nancy C.; and Vallabhaneni, Rao V., 5,073,180, Cl. 65-18.400.
Galand, Claude, 5,073,938, Cl. 381-34.000.
Hoffman, Charles R., 5,073,730, Cl. 307-480.000.
Locke, Michael E., 5,073,941, Cl. 381-47.000.
Matyas, Stephen M.; Johnson, Donald B.; Le, An V.; Martin, William C.; Prymak, Rostislaw; Rohland, William S.; and Wilkins, John D., 5,073,934, Cl. 380-30.000.
International Composites Corporation: *See*—
Thompson, William L., 5,072,504, Cl. 29-426.600.
International Computers Limited: *See*—
Martin, Michael W.; Moor, John C.; and Bird, Terence J., 5,073,854, Cl. 364-425.000.
Interstate Electronics Corp.: *See*—
Buhler, Frederick T., 5,073,744, Cl. 315-8.000.
Iowa State University Research Foundation, Inc.: *See*—
Schmidt, Frederick A.; Wheelock, John T.; and Peterson, David T., 5,073,337, Cl. 420-83.000.

Irbit Research & Consulting AG: *See*—
Irrgeher, Fritz; and Frank, Werner, 5,072,952, Cl. 277-229.000.
Irie, Yoshio; Morihiro, Shigeyasu; Fujiwara, Teruaki; Sasabe, Masazumi; and Iwasaki, Kaoru, to Nippon Shokubai Kagaku Kogyo, Co., Ltd. Hydrophilic polymer and method for production thereof. 5,073,612, Cl. 526-240.000.
Iron Carbide Holdings, Limited: *See*—
Stephens, Frank A.; Hager, John P.; and Stephens, Frank M., Jr., 5,073,194, Cl. 75-376.000.
Irrgeher, Fritz; and Frank, Werner, to Irbit Research & Consulting AG. Sealing element. 5,072,952, Cl. 277-229.000.
Irvine, Earl L. Knock-down roadside trash protector. 5,072,828, Cl. 220-4.330.
Irving, Edward: *See*—
Banks, Christopher P.; and Irving, Edward, 5,073,233, Cl. 156-656.000.
Banks, Christopher P.; and Irving, Edward, 5,073,478, Cl. 430-317.000.
Isaka, Kazuo: *See*—
Mouri, Akihiro; Katayama, Masato; Fukui, Tetsuro; Isaka, Kazuo; Kikuchi, Shoji; and Koumura, Noboru, 5,073,791, Cl. 355-27.000.
Iscom S.r.l.: *See*—
Menegoli, Fabio, 5,072,563, Cl. 52-537.000.
Ishida, Keiichiro: *See*—
Arima, Masatoshi; Nishizawa, Hiroaki; Takeuchi, Keiji; Deura, Hiroshi; and Ishida, Keiichiro, 5,073,545, Cl. 514-27.000.
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Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.
Ishigaki, Tsuneo, to SMC Corporation. Gas cleaner. 5,072,592, Cl. 62-55.500.
Ishii, Hitoshi: *See*—
Horiye, Fusamaro; and Ishii, Hitoshi, 5,072,627, Cl. 74-6.000.
Ishii, Kazuo: *See*—
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Ishii, Takayuki: *See*—
Yamada, Katsuhiko; Hatanaka, Katsunori; Saika, Toshihiro; and Ishii, Takayuki, 5,073,828, Cl. 358-482.000.
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, to Hitachi, Ltd.; and Hitachi Chemical Company, Ltd. Electrophotographic member and process for producing the same. 5,073,466, Cl. 430-66.000.
Ishikawa, Seiichi: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.
Ishikawa, Toshihiro: *See*—
Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, 5,072,966, Cl. 280-730.000.
Ishikawa, Yasushi; Tomono, Fumio; and Fujita, Tetsuya, to Seikosha Co., Ltd. Developing device of electrophotographic printer. 5,072,690, Cl. 118-658.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.
Ishino, Yoshio: *See*—
Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, 5,073,375, Cl. 424-449.000.
Ishioka, Hidenori: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.
Isler, Billy W. Knife with two wheels. 5,072,471, Cl. 7-158.000.
Isobe, Tami, to Ricoh Company, Ltd. Method for measuring refractive index of thin film layer. 5,073,026, Cl. 356-369.000.
Isoe, Noboru: *See*—
Niimi, Hideaki; Isoe, Noboru; Wakai, Kunio; and Mizumura, Tetsuo, 5,073,449, Cl. 428-336.000.
Isono, Kazuaki: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.
Isono, Kazuki: *See*—
Yamada, Yukio; Furukawa, Akio; and Isono, Kazuki, 5,073,823, Cl. 358-209.000.
Isozaki, Yoshimasa; and Oba, Yasuhiko, to Yamaha Corporation. Synthetic recording device in an automatic performance piano. 5,072,644, Cl. 84-609.000.
ISP Investments Inc.: *See*—
Kopolow, Stephen L.; and Burlant, William J., 5,073,296, Cl. 252-312.000.
Shih, Jenn S.; Smith, Terry E.; and Chuang, Jui-Chang, 5,073,614, Cl. 526-258.000.
Isuzu Ceramics Research Institute Co., Ltd.: *See*—
Kawamura, Hideo, 5,072,700, Cl. 123-90.110.
Ito, Hideyoshi: *See*—
Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,073,517, Cl. 437-153.000.
Ito, Masaya; and Miyama, Katsumi, to NGK Spark Plug Co., Ltd. Ceramic turbocharger rotor. 5,073,085, Cl. 415-216.100.
Ito, Masazumi: *See*—
Kato, Tomokazu; Maruta, Syuzi; Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, 5,073,803, Cl. 355-324.000.
Ito, Osamu; and Hayashi, Shigeo, to Mitsubishi Denki Kabushiki Kaisha. Optical memory disc driving apparatus. 5,073,885, Cl. 369-44.280.
Ito, Ryoichi: *See*—
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Ito, Shinichi; Noshi, Naoya; and Okamoto, Yutaka, to Sony Corporation. Method of manufacturing MIS semiconductor device. 5,073,514, Cl. 437-44.000.
Ito, Takahiko: *See*—
Kazino, Hiroshi; and Ito, Takahiko, 5,073,073, Cl. 411-386.000.
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Uemura, Toshiya, to Toyoda Gosei Co., Ltd. Electrochromic device with a reference electrochromic element. 5,073,011, Cl. 359-265.000.
Ito, Yukio: *See*—
Hara, Yasushi; Suzuki, Nobumasa; Ito, Yukio; and Sekizawa, Kazuhiko, 5,073,649, Cl. 564-479.000.
Ito, Yutaka: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.
Itoh, Mikio: *See*—
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Itoh, Teruyuki: *See*—
Urushihara, Tomonori; Yokoyama, Junichi; and Itoh, Teruyuki, 5,072,583, Cl. 60-313.000.
Itoh, Toshiaki: *See*—
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.
Itoh, Toshikazu; and Suemune, Toshiroh, to Oki Electric Industry Co., Ltd. Method of and apparatus for preventing overheating of heating element. 5,073,861, Cl. 364-550.000.
ITT Corporation: *See*—
Vensko, George; Lieu, Khuong B.; Meloche, Steven A.; and Potter, John C., 5,073,939, Cl. 381-43.000.
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Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.
Ivan, Bela; Kennedy, Joseph P.; and Mackey, Paul W., to University of Akron. Amphiphilic networks. 5,073,381, Cl. 424-487.000.
Iverson, Donald G., Jr.; and Daiber, Troy D., to Boeing Company, The. System for determining position of normal shock in supersonic flow. 5,072,612, Cl. 73-118.200.
Iverson, Robert A.: *See*—
Peterson, Stephen S.; Blawd, Harold C.; Heutmaker, Michael E.; Engel, Timothy S.; and Iverson, Robert A., 5,072,929, Cl. 272-72.000.
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Kato, Hideo; Kikuchi, Shinichi; Nakai, Hiroto; and Iwahashi, Hiroshi, 5,073,726, Cl. 307-443.000.
Iwamura, Tatsuichi: *See*—
Takagi, Osamu; Azuma, Kishiro; and Iwamura, Tatsuichi, 5,073,357, Cl. 423-308.000.
Iwane, Yasushi, to Mitsubishi Denki Kabushiki Kaisha. Method for correcting waveform data in digital signal modulation and base band signal generator using data provided by this method. 5,073,901, Cl. 375-26.000.
Iwasaki, Kaoru: *See*—
Irie, Yoshio; Morihiro, Shigeyasu; Fujiwara, Teruaki; Sasabe, Masazumi; and Iwasaki, Kaoru, 5,073,612, Cl. 526-240.000.
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Sakamura, Ken; Hashimoto, Kouzi; Kawasaki, Ikuya; Hasegawa, Atsushi; and Iwasaki, Kazuhiko, 5,073,856, Cl. 395-375.000.
Iwasaki, Takeshi: *See*—
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Iwase, Yoki: *See*—
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Sakamoto, Keiji; and Iwashita, Yasusuke, 5,073,746, Cl. 318-560.000.
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, to Sankyo Company Limited; and Ube Industries Limited. 4-oxoquinoline-3-carboxylic acid derivatives and their use. 5,073,556, Cl. 514-254.000.
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Izumida, Toshiaki: *See*—
Umemura, Toshikazu; Matsumura, Makoto; Izumida, Toshiaki; and Akahori, Kazuyuki, 5,073,313, Cl. 264-1.100.
J. F. Walton & Co., Inc.: *See*—
Walton, James F., 5,072,487, Cl. 15-406.000.
J. M. Voith GmbH: *See*—
Kuhne, Viktor, 5,072,818, Cl. 192-106.100.
J. Wagner GmbH: *See*—
Gebauer, Gerhard; Goes, Wilfried; and Rosenauer, Otto, 5,073,092, Cl. 417-383.000.
Jackel, Johann: *See*—
Friedman, Oswald; Elison, Hans-Dieter; and Jackel, Johann, 5,073,143, Cl. 464-68.000.
Jackson, Donald T.; and Robinson, Joel D. Automatic welding electrode cap changer. 5,073,692, Cl. 219-86.800.
Jackson, Willard O. Vehicle cap window and hinge therefor. 5,072,984, Cl. 296-56.000.
Jacobsen, Carl D.: *See*—
Lunzer, Lawrence J.; and Jacobsen, Carl D., 5,073,709, Cl. 250-226.000.
Jacobson, David M.: *See*—
Humpston, Giles; and Jacobson, David M., 5,073,210, Cl. 148-11.50R.
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Craves, Roderick M.; Korany, Franklyn J.; and Jacobson, Mark J., 5,073,326, Cl. 264-278.000.
Jaenke, Paul E.; and Armiger, Ronald E., to Westinghouse Electric Corp. Low impedance connector. 5,073,121, Cl. 439-92.000.
Jagenberg Aktiengesellschaft: *See*—
Urban, Ernst-Gunther; and Knoll, Heiko-Christian, 5,072,641, Cl. 83-499.000.
Jaguar Cars Limited: *See*—
Parsons, Bryan N. V., 5,072,653, Cl. 92-126.000.
Jakob Schlaepfer & Co. AG: *See*—
Kurihara, Akira, 5,073,223, Cl. 156-362.000.
Jakubowicz, Raymond F.: *See*—
Porte, Johannes J.; and Jakubowicz, Raymond F., 5,073,342, Cl. 422-64.000.
James, Bonnie L. Holder for infant feeding device. 5,072,843, Cl. 215-100.00R.
Jang, Shiau R.: *See*—
Tai, Wu D.; Tzei, Chen Y.; and Jang, Shiau R., 5,072,986, Cl. 296-97.220.
Jang, Taek-Yong: *See*—
Kwon, Oh-Hyun; Jang, Taek-Yong; Shin, Jung-Hyun; and Choi, Won-Taek, 5,073,510, Cl. 437-40.000.
Janice Industries, Inc.: *See*—
Aubrey, Truman R., 5,073,845, Cl. 362-226.000.
Janitschke, Lothar: *See*—
Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, 5,073,538, Cl. 512-9.000.
Jansen, Frank; and Kuhman, Daniel E., to Xerox Corporation. Coating processes for an ink jet printhead. 5,073,785, Cl. 346-1.100.
Jansen, Klaas: *See*—
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Japan Aviation Electronics Industry, Limited: *See*—
Hashiguchi, Osamu; Tayama, Yukiharu; and Yamamura, Shigeharu, 5,073,125, Cl. 439-310.000.
Jarabak, Andrew J.; Sunderman, Wallace H.; and Mendola, Edward G., to Westinghouse Electric Corp. Apparatus and process for making a superconducting magnet for particle accelerators. 5,072,516, Cl. 29-609.000.
Jarvis, Roger P., to Automotive Products plc. Power line to drive a vehicle. 5,072,815, Cl. 192-0.080.
Jeeves, Terry A.: *See*—
Murphy, John H.; and Jeeves, Terry A., 5,073,867, Cl. 395-27.000.
Jenkins, Sandra D., to Southern Communications, Inc. Illuminated sign with self-supporting display box. 5,072,535, Cl. 40-564.000.
Jensen, Jack E.: *See*—
Parekh, Ebrahim; Jensen, Jack E.; and Summers, Jeffrey L., 5,073,072, Cl. 411-354.000.
Jerison, Andrew D.: *See*—
Colbert, Charles; Jerison, Andrew D.; Berelman-Hall, David K.; Moles, Donald R.; and Potter, Nathan D., 5,073,950, Cl. 382-2.000.
Jeter, John D., to Schlumberger Canada Limited. Signal pressure pulse generator. 5,073,877, Cl. 367-84.000.
Jidosha Denki Kogyo K.K.: *See*—
Tohge, Kazuyoshi; and Takeshita, Junichiro, 5,073,722, Cl. 307-10.100.
Jimenez, Jesus. Seal puncture fitting on a liquid container. 5,072,762, Cl. 141-329.000.
Jinkins, Danny R.; and Doeden, Douglas D., to Doler Inc. Peck feed drilling machine. 5,073,068, Cl. 408-17.000.
John, Angelo P. Ischemia-reperfusion tumor therapy. 5,072,739, Cl. 128-897.000.
John Fluke Mfg. Co., Inc.: *See*—
George, Richard E., 5,073,757, Cl. 324-677.000.
John Mezzalingua Assoc. Inc.: *See*—
Szegda, Andrew, 5,073,129, Cl. 439-585.000.
Johns Hopkins University, The: *See*—
Chen, Chung-Ho; and Sumi, Chen C., 5,073,492, Cl. 435-240.200.
Johnson, Bruce R.: *See*—
LeBlanc, Leo J.; and Johnson, Bruce R., 5,072,912, Cl. 251-63.500.
Johnson, Donald B.: *See*—
Matyas, Stephen M.; Johnson, Donald B.; Le, An V.; Martin, William C.; Prymak, Rostislaw; Rohland, William S.; and Wilkins, John D., 5,073,934, Cl. 380-30.000.
Johnson, Ivy D.: *See*—
Angevine, Philip J.; Johnson, Ivy D.; Marler, David O.; and McWilliams, John P., 5,073,655, Cl. 585-467.000.
Johnson, John B. Exercise apparatus. 5,072,932, Cl. 272-116.000.
Johnson, Kristina M.; Mao, Chongchang; and Abdulhalim, Ibrahim S., to University of Colorado Foundation, Inc. Optically addressable spatial light modulator having a distorted helix ferroelectric liquid crystal member. 5,073,010, Cl. 359-72.000.
Johnson, Mack E.: *See*—
Price, Macy J., Jr.; Ball, Laurence G.; and Johnson, Mack E., 5,072,835, Cl. 211-40.000.
Price, Macy J., Jr.; Johnson, Mack E.; and Starkey, Daniel C., 5,072,838, Cl. 211-162.000.
Johnson, Michael I. Seismic reinforcement structure. 5,072,570, Cl. 52-747.000.
Johnson, Nigel L., to U.S. Philips Corporation. Watchdog circuit for monitoring programs and detecting infinite loops using a changing multibit word for timer reset. 5,073,853, Cl. 395-575.000.
Johnson, Nolton C. Automatic self-contained stacking machine. 5,073,081, Cl. 414-786.000.
Johnson, Richard J.; Chenoweth, Dennis E.; Boggs, Daniel R.; and Lysaght, Michael J. Methods of manufacturing nucleophilic material modified for improved biocompatibility. 5,073,265, Cl. 210-500.230.
Johnson, Rick: *See*—
Holmes, Thomas F.; Johnson, Rick; and Lenhart, Brian P., Jr., 5,073,767, Cl. 340-311.100.
Johnson, Ronald E.; Thompson, Richard W.; and Wu, Lung-Ming, to Corning Incorporated. Decalcomania. 5,073,423, Cl. 428-40.000.
Johnson, Wayne O., to Rohm and Haas Company. Herbicidal amides of 4-trifluoromethyl-3'-carboxyl-4'-nitrodiphenyl ethers. 5,073,188, Cl. 71-92.000.
Johnston, Harold. Method of cutting gemstones and product. 5,072,549, Cl. 51-283.00R.
Jomura, Shigeru; and Watanabe, Junichi, to Hitachi Metals, Ltd. Laminate-type displacement element. 5,073,740, Cl. 310-358.000.
Jones Environics Ltd.: *See*—
Lapowsky, Andrew, 5,072,790, Cl. 165-166.000.
Jones, Jonathan; and Maliga, Pal, to DNA Plant Technology Corporation. Method of introducing spectinomycin resistance into plants. 5,073,675, Cl. 800-205.000.
Jones, Stephen. Industrial restraint edging system for segmented paving units. 5,073,061, Cl. 404-7.000.
Jorde, Michael J.; and Brehm, Mark A. Heated door. 5,072,659, Cl. 454-174.000.
Jorge, Edward M.; Torres, Antonio; and Lund, Monty M., deceased (by Lund, Lorraine K., administrator), to Dow Chemical Company, The. Barrier film and process for making. 5,073,617, Cl. 526-343.000.
Josephson, Joseph P. Visual display supporting structure. 5,073,059, Cl. 402-80.00R.
Jost, John W.: *See*—
Gallup, Darrell L.; and Jost, John W., 5,073,270, Cl. 210-698.000.
Jou, Wen-San. Liquid dispensing controller. 5,072,861, Cl. 222-481.000.
Jouef Industries S.A.: *See*—
Coron, Jean-Pierre, 5,073,750, Cl. 318-58.700.
Joy Technologies Inc.: *See*—
Wechner, Edward, 5,072,826, Cl. 198-520.000.
Jubran, William; and Carossino, Andre, to Vargus Ltd. Round scraper tool. 5,072,514, Cl. 30-169.000.
Juki Corporation: *See*—
Satoma, Shiro, 5,072,678, Cl. 112-225.000.
Junino, Alex: *See*—
Vayssie, Charles; Bauer, Daniel; Richard, Francoise; and Junino, Alex, 5,073,174, Cl. 8-406.000.
Juri, Tatsuro, to Matsushita Electric Industrial Co., Ltd. Orthogonal transform coding apparatus for reducing the amount of coded signals to be processed and transmitted. 5,073,821, Cl. 358-133.000.
Justice, Donald R. Coupling device. 5,072,972, Cl. 285-373.000.
K-Flow Corporation: *See*—
Wong, Richard B.; and Pratt, Wayne, 5,073,208, Cl. 148-11.50R.
Kabayama, Mineaki: *See*—
Suzuki, Takeshi; and Kabayama, Mineaki, 5,073,385, Cl. 424-630.000.
Kabelac, William J.: *See*—
Best, John S.; Hetzler, Steven R.; Kabelac, William J.; and Thompson, David A., 5,073,834, Cl. 360-77.080.
Kabelmetal Electro GmbH: *See*—
Ziemek, Gerhard, 5,072,870, Cl. 228-102.000.
K.K. Aoyama Seisakusho: *See*—
Kazino, Hiroshi; and Ito, Takahiko, 5,073,073, Cl. 411-386.000.
Kabushiki Kaisha Boron International: *See*—
Nose, Katsuhiko; Kuze, Katsuaki; and Tatsuta, Hideaki, 5,073,455, Cl. 428-411.100.
Kabushiki Kaisha Daikin Seisakusho: *See*—
Takeuchi, Hiroshi; and Mizuguchi, Kimio, 5,072,816, Cl. 192-70.120.
Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See*—
Matsuhashi, Tyoku; Usui, Mitsuko; Mitsuhashi, Masakazu; and Ando, Shunsaku, 5,073,628, Cl. 530-379.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Furusawa, Sadayoshi; Hasegawa, Toyofumi; Nakahara, Takeshi; and Kato, Takehiko, 5,073,338, Cl. 420-109.000.
Miyao, Hidehiko; Shiotsuki, Masao; Kawamura, Shigeyoshi; and Komatsu, Fumiaki, 5,073,305, Cl. 252-633.000.

Kabushiki Kaisha Kosmek: *See*—
Yamada, Sohei; and Orihashi, Hatsuo, 5,072,819, Cl. 193-35.00R.

Kabushiki Kaisha Meidenshae: *See*—
Watanabe, Misuzu, 5,073,241, Cl. 204-192.150.

Kabushiki Kaisha Sakura Kurepasu: *See*—
Fukuoka, Mitsuhiro; and Kobayashi, Nobuaki, 5,073,058, Cl. 401-260.000.

Kabushiki Kaisha Toshiba: *See*—
Ando, Hideo; and Nakamura, Yuichi, 5,073,879, Cl. 369-13.000.
Asahina, Hiroshi; and Yasuhara, Hiroshi, 5,073,914, Cl. 378-42.000.
Idei, Yasuo, 5,073,806, Cl. 357-17.000.
Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,073,517, Cl. 437-153.000.
Kato, Hideo; Kikuchi, Shinichi; Nakai, Hiroto; and Iwahashi, Hiroshi, 5,073,726, Cl. 307-443.000.
Masuda, Masami; and Nakamura, Kenichi, 5,073,872, Cl. 365-189.050.
Morita, Shigeru; Yamabe, Kikuo; and Kakumu, Masakazu, 5,073,813, Cl. 357-49.000.
Nogami, Kazutaka, 5,073,873, Cl. 365-189.050.
Nomura, Norimasa; and Nishihata, Masahiro, 5,073,921, Cl. 379-100.000.
Ohashi, Kunio; and Matsumoto, Kunihiko, 5,073,832, Cl. 360-75.000.
Okazaki, Takahisa; Okumoto, Shinichi; and Nakajima, Hirotaka, 5,072,735, Cl. 128-660.070.
Ozaki, Masahiro; and Rifu, Toshihiro, 5,073,911, Cl. 378-17.000.
Shimanuki, Masanobu, 5,073,928, Cl. 379-70.000.
Suzuki, Kensuke; and Kohayakawa, Hiromasa, 5,073,796, Cl. 355-215.000.
Takeda, Masahiro; and Uchida, Satoshi, 5,073,949, Cl. 382-2.000.
Yamashita, Youji; and Kojima, Masakatu, 5,073,229, Cl. 156-605.000.

K.K. Ueno Seiyaku Oyo Kenkyujo: *See*—
Ueno, Ryuzo; Ueno, Ryuji; Kato, Ichie; and Oda, Tomio, 5,073,569, Cl. 514-530.000.

Kagawa, Noriyasu: *See*—
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

Kagechika, Hiroshi; Mishima, Tadahiko; and Kibe, Hiroshi, to NKK Corporation. Aluminum-plated steel sheet for cans. 5,073,403, Cl. 427-38.000.

Kageyama, Fumio: *See*—
Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, 5,072,995, Cl. 303-100.000.

Kageyama, Satoshi; and Fukuhara, Suemei, to Matsushita Electric Industrial Co., Ltd. Loudspeaker system. 5,073,945, Cl. 381-89.000.

Kagita, Kazuhiro, to Nippon Seiko Kabushiki Kaisha. Direct drive type rotation dividing table. 5,072,651, Cl. 92-75.000.

Kagoshige, Shinji: *See*—
Usui, Tadashi; and Kagoshige, Shinji, 5,072,789, Cl. 165-134.100.

Kairos S.N.C. Di M. Bonetti, A. Manente, E. A. Mion Ing. & Arch.: *See*—
Bonetti, Massimo; Manente, Giuseppe; and Mion, Abramo, 5,072,768, Cl. 160-199.000.

Kairy, Mostafa; Tinet, Daniel; and Van Damme, Henri, to Rhone-Poulenc Chimie. Bridge/lamellar metallic oxides. 5,073,360, Cl. 423-608.000.

Kaiserman, Howard B.: *See*—
Hessel, John F.; Aronson, Michael P.; Cardinali, Martin S.; and Kaiserman, Howard B., 5,073,292, Cl. 252-174.120.

Kaitandjian, Michel; Pradat, Philippe J.; Latouche-Halle, Jean P.; and Falipou, Alain M., to Compagnie de Signaux et d'Equipements Electroniques; and Etat Francais Represente Par le Delegue Genral pour l'Armement. Capacitive type electric energy accumulator of high capacity. 5,073,751, Cl. 320-1.000.

Kajiwara, Toshiro; Kobayashi, Goroku; Fukuyama, Keiji; Sano, Ko; Yano, Yojiro; and Watanabe, Keiji, to Mitsubishi Denki Kabushiki Kaisha. Electrode for discharge light source. 5,073,743, Cl. 313-346.00R.

Kakitani, Tsutomu, to Toshiba Lighting and Technology Group. Inverter circuit for stable illumination of discharge lamp. 5,073,745, Cl. 315-307.000.

Kakumu, Masakazu: *See*—
Morita, Shigeru; Yamabe, Kikuo; and Kakumu, Masakazu, 5,073,813, Cl. 357-49.000.

Kalamazoo Holdings, Inc.: *See*—
Todd, Paul H., Jr., 5,073,396, Cl. 426-592.000.

Kamada, Teruo: *See*—
Namba, Takaoki; and Kamada, Teruo, 5,072,782, Cl. 164-45.000.

Kamata, Toshio: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Kambe, Shigemitsu: *See*—
Yano, Katsumi; and Kambe, Shigemitsu, 5,073,420, Cl. 428-35.700.

Kamei, Masanao: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Kanazawa, Hideki; Yamada, Yoko; and Etoh, Yuko, 5,073,306, Cl. 252-299.610.

Kamijo, Tetsuhide; Ujiie, Arao; Tsutsumi, Naoyuki; and Tsubaki, Atsushi, to Kissei Pharmaceutical Co., Ltd. 3-alkoxy substituted benzofuro[3,2-c]quinolin-6-one compounds. 5,073,553, Cl. 514-232.800.

Kamiyama, Misao, to Takata Corporation. Shoulder belt adjusting apparatus of a seat belt. 5,072,969, Cl. 280-808.000.

Kamon, Kazuya, to Mitsubishi Denki Kabushiki Kaisha. Angle detector device for silicon wafers. 5,073,918, Cl. 378-205.000.

Kamono, Takeshi: *See*—
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Taniishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Kanaoka, Tomizo: *See*—
Takano, Hiroshi; Masuda, Takashi; Kanaoka, Tomizo; Akao, Hideyuki; Hioki, Katsuyuki; and Aragane, Toshiaki, 5,073,147, Cl. 474-28.000.

Kanayama, Yutaka, to Shinko Electric Co., Ltd.; and Sogo Securities Co., Ltd. Mobile robot navigating method. 5,073,749, Cl. 318-587.000.

Kanazawa, Hideki: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Kanazawa, Hideki; Yamada, Yoko; and Etoh, Yuko, 5,073,306, Cl. 252-299.610.

Kanbara, Shinji: *See*—
Fujihira, Shinji; Yanagidani, Yuko; Tohda, Isao; and Kanbara, Shinji, 5,072,698, Cl. 123-52.0MB.

Kane, John P.; and Goodman, Francis H., to American Hofmann Corporation. Auxiliary tire bead depressor. 5,072,765, Cl. 157-1.100.

Kanegae, Takahiro: *See*—
Kawamoto, Naoyuki; Yoshida, Hitoshi; and Kanegae, Takahiro, 5,073,956, Cl. 382-22.000.

Kaneko, Kiyokazu, to Akebono Brake Industry Co., Ltd. Brake booster-mounting instruction. 5,072,607, Cl. 92-161.000.

Kaneko, Kiyoshi: *See*—
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Taniishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Kaneko, Toshimi; and Maeda, Eiichi, to Murata Mfg. Co., Ltd. Method of making an inductive-resistive circuit element. 5,072,508, Cl. 29-605.000.

Kani, Yasunobu: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Kansai Paint Co., Ltd.: *See*—
Nakao, Yasushi; Fukuda, Mitsuhiro; and Yabuta, Motoshi, 5,073,602, Cl. 525-155.000.

Kansupada, Bharat K.; Phillips, Martin A., Jr.; and Mallamaci, Ottavio J., to Goodyear Tire & Rubber Company, The. Film composite and packaged tire therewith. 5,073,419, Cl. 428-35.400.

Kantor, Isaak, to Epilady International Inc. Hair grooming device. 5,072,746, Cl. 132-219.000.

Kanzaki Paper Mfg. Co., Ltd.: *See*—
Shimada, Fumihiro; and Uemura, Hisashi, 5,073,786, Cl. 346-76.0PH.

Kao Corporation: *See*—
Deguchi, Katsuhiko; Saito, Kozo; and Saijo, Hiroyuki, 5,073,293, Cl. 252-174.170.

Kaplan, Morris: *See*—
Stephenson, William K.; and Kaplan, Morris, 5,073,248, Cl. 208-22.000.

Kaptanoglu, Sinan: *See*—
Greene, Johathan W.; El Gamal, Abbas A.; and Kaptanoglu, Sinan, 5,073,729, Cl. 307-465.100.

Karkota, Frank P., Jr.: *See*—
Tendler, Robert K.; and Karkota, Frank P., Jr., 5,073,972, Cl. 455-35.000.

Karl Mayer Textilmaschinenfabrik GmbH: *See*—
Naumann, Rolf, 5,072,602, Cl. 66-84.00A.

Kasai, Minoru; and Nakamura, Minoru, to Hitec Co., Ltd. Method and apparatus for suspending casing products filled with material. 5,073,142, Cl. 452-51.000.

Kashino, Minoru: *See*—
Bizen, Kunio; Kashino, Minoru; Suzuki, Tasuku; Hasegawa, Ryuichi; and Hayashi, Koji, 5,073,316, Cl. 264-22.000.

Kashiwagi, Shinichi, to Tokyo Electric Co., Ltd. Color discrimination apparatus for color ink ribbon. 5,073,053, Cl. 400-240.300.

Kassarich, Jacob. Noise-maker. 5,073,139, Cl. 446-242.000.

Kast, Hellmut: *See*—
Dix, Johannes P.; Hansen, Guenter; and Kast, Hellmut, 5,073,634, Cl. 544-103.000.

Katayama, Kenji; and Yashiki, Seiji, to Mazda Motor Corporation. Fuel injection control system for automotive engine. 5,072,711, Cl. 123-486.000.

Katayama, Masato: *See*—
Mouri, Akihiro; Katayama, Masato; Fukui, Tetsuro; Isaka, Kazuo; Kikuchi, Shoji; and Koumura, Noboru, 5,073,791, Cl. 355-27.000.

Katayama, Yoshihiro: *See*—
Ono, Taizo; Sakamoto, Hirotsugu; Katayama, Yoshihiro; and Saitoh, Toshi, 5,073,797, Cl. 355-215.000.

Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electrophotographic photoreceptor. 5,073,467, Cl. 430-87.000.

Kato, Eiichi; and Hattori, Hideyuki, to Fuji Photo Film Co., Ltd. Liquid developer for electrostatic photography. 5,073,470, Cl. 430-114.000.

Kato, Eiichi; and Hattori, Hideyuki, to Fuji Photo Film Co., Ltd. Liquid developer for electrostatic photography. 5,073,471, Cl. 430-114.000.

Kato, Hideki: *See*—
Iinuma, Tomohisa; Yamamoto, Noriyuki; and Kato, Hideki, 5,073,580, Cl. 523-442.000.

Kato, Hideo; Kikuchi, Shinichi; Nakai, Hiroto; and Iwahashi, Hiroshi, to Kabushiki Kaisha Toshiba. Input circuit of semiconductor integrated circuit and semiconductor integrated circuit having input circuit. 5,073,726, Cl. 307-443.000.

Kato, Ichie: *See*—
Ueno, Ryuzo; Ueno, Ryuji; Kato, Ichie; and Oda, Tomio, 5,073,569, Cl. 514-530.000.

Kato, Kazuro: *See*—
Uematsu, Masahiro; Hiratsuka, Ryuichi; and Kato, Kazuro, 5,073,783, Cl. 342-359.000.

Kato, Mamoru: *See*—
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Uemura, Toshiya, 5,073,011, Cl. 359-265.000.

Kato, Satoshi: *See*—
Suga, Yoshinori; Tanaka, Eiji; Kato, Satoshi; and Sato, Kaoru, 5,073,427, Cl. 428-64.000.

Kato, Takehiko: *See*—
Furusawa, Sadayoshi; Hasegawa, Toyofumi; Nakahara, Takeshi; and Kato, Takehiko, 5,073,338, Cl. 420-109.000.

Kato, Tomokazu; Maruta, Syuzi; Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, to Minolta Camera Kabushiki Kaisha. Copying apparatus provided with an automatic document feeder and a sheet binding unit. 5,073,803, Cl. 355-324.000.

Katsube, Tetsushi: *See*—
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, 5,073,556, Cl. 514-254.000.

Katsuno, Hisashi; and Sugimoto, Michio, to Research Association for Utilization of Light Oil. Process for preparing aromatic hydrocarbons. 5,073,652, Cl. 585-419.000.

Katsuta, Tsuyoshi; and Shiraishi, Yasuhito, to Konica Corporation. Cassette supply apparatus. 5,073,829, Cl. 358-498.000.

Katz, Martin; Leong, Helen C.; and Cheng, Chung-Heng, to Advanced Polymer Systems. Clinical and personal care articles enhanced by lubricants and adjuvants. 5,073,365, Cl. 424-489.000.

Katz, Morton, to Du Pont de Nemours, E. I., and Company. Polyimide compositions containing polyorganosiloxane for improving atomic oxygen resistance. 5,073,607, Cl. 525-431.000.

Katz, Ronald A., to First Data Resources Inc. Voice-data telephonic control system. 5,073,929, Cl. 379-93.000.

Kaucic, Robert, to Express Marine, Inc. Hydraulic system for tug/barge connections. 5,072,685, Cl. 114-249.000.

Kaufman, Josef, to Sulzer Brothers Limited. Device for drawing a yarn into a weft accumulator. 5,072,760, Cl. 139-452.000.

Kaufmann, Bruno: *See*—
Schanz, Klaus; Martin, Roland; and Kaufmann, Bruno, 5,073,573, Cl. 514-844.000.

Kautt, M. J., to Ferco International Usine de Ferrures de Batiment. Installation for automatic assembly of socket-bracket. 5,072,495, Cl. 29-33.00K.

Kawahara, Akira: *See*—
DiMarco, Brain A.; Kawahara, Akira; and Nagase, Ryo, 5,073,043, Cl. 385-81.000.

Kawahara, Eiichiro: *See*—
Ikejiri, Kenichi; Kawahara, Eiichiro; and Furumoto, Mitsumasa, 5,072,587, Cl. 60-488.000.

Kawahara, Hideo: *See*—
Goda, Takuji; Nagayama, Hirotsugu; and Kawahara, Hideo, 5,073,408, Cl. 427-169.000.

Kawahata, Kazunari, to Murata Manufacturing Co., Ltd. High frequency broad-band mixing circuit including an electrolytic capacitor in parallel with a local oscillator input port. 5,073,977, Cl. 455-330.000.

Kawamoto, Naoyuki; Yoshida, Hitoshi; and Kanegae, Takahiro, to Brother Kogyo Kabushiki Kaisha. Apparatus for converting image outline data into dot data representative of dots to be formed. 5,073,956, Cl. 382-22.000.

Kawamoto, Ryuichi: *See*—
Saito, Shiro; Shirai, Kenji; Kawamoto, Ryuichi; and Sakakibara, Shigeru, 5,073,500, Cl. 436-53.000.

Kawamura, Akihisa: *See*—
Yoshida, Hiroko; Serikawa, Mitsuhiko; Kawamura, Akihisa; Matsumoto, Masaharu; and Sato, Katsuaki, 5,073,942, Cl. 381-61.000.

Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Electromagnetic valve control system. 5,072,700, Cl. 123-90.110.

Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, to Mazda Motor Corporation. Slip control mechanism of a car. 5,072,995, Cl. 303-100.000.

Kawamura, Nobuya: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.

Kawamura, Shigeyoshi: *See*—
Miyao, Hidehiko; Shiotsuki, Masao; Kawamura, Shigeyoshi; and Komatsu, Fumiaki, 5,073,305, Cl. 252-633.000.

Kawamura, Tamotsu: *See*—
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, 5,072,526, Cl. 34-60.000.

Kawamura, Yozo: *See*—
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, 5,072,526, Cl. 34-60.000.

Kawanaka, Seido: *See*—
Nakai, Yoshiyuki; Maruta, Kazuo; Nakajima, Tatsushi; and Kawanaka, Seido, 5,073,960, Cl. 382-22.000.

Kawasaki, Ikuya: *See*—
Sakamura, Ken; Hashimoto, Kouzi; Kawasaki, Ikuya; Hasegawa, Atsushi; and Iwasaki, Kazuhiko, 5,073,856, Cl. 395-375.000.

Kawasumi, Koichi: *See*—
Shirakura, Akira; Tsuchiya, Takao; Watanabe, Haruo; and Kawasumi, Koichi, 5,073,798, Cl. 355-245.000.

Kayano, Katsunari, to Akebono Brake Industry Co., Ltd. Hot press for heat forming a disc pad. 5,073,099, Cl. 425-125.000.

Kazino, Hiroshi; and Ito, Takahiko, to K.K. Aoyama Seisakusho. Self-aligning bolt and a self-aligning nut. 5,073,073, Cl. 411-386.000.

Keating, Gerry: *See*—
Corrigan, Niall; Keating, Gerry; and Beegan, Desmond, 5,073,074, Cl. 411-393.000.

Keck, Albrecht: *See*—
Freymann, Raymond; Keck, Albrecht; and Haas, Anton, 5,072,801, Cl. 180-68.500.

Kedmi, Joseph; and Grossinger, Israel, to Holo-Or Ltd. Diffractive optical element. 5,073,007, Cl. 359-565.000.

Keegan, John J., Jr.: *See*—
Hommes, William J.; and Keegan, John J., Jr., 5,072,493, Cl. 26-72.000.

Kehrberger, Achim L.: *See*—
Mauch, Magnus; and Kehrberger, Achim L., 5,072,584, Cl. 60-378.000.

Keller, Charles T.; and Wu, Schyi-Yi, to Motorola, Inc. Producing a plasma containing beryllium and beryllium fluoride. 5,073,507, Cl. 437-22.000.

Keller, Wilhelm A. Flow mixer. 5,072,862, Cl. 222-496.000.

Kellogg Company: *See*—
Van Fulpen, Lisa, 5,072,877, Cl. 229-155.000.

Kelly, James B.: *See*—
Patterson, Gregory S.; and Kelly, James B., 5,072,580, Cl. 60-242.000.

Kelly, Julia F. Decorative picture frame. 5,072,532, Cl. 40-152.100.

Kelly, Michael C.; and Lindsay, Richard O., to Amoco Corporation. Method of enhancing geophysical data. 5,073,875, Cl. 367-38.000.

Kemlo, Kenneth G., to Broken Hill Proprietary Company Limited, The. Flame detection. 5,073,104, Cl. 431-12.000.

Kempe, Uwe: *See*—
Sander, Bruno; Marquardt, Siegfried; Kempe, Uwe; Vodrazka, Wolfgang; and Lueth, Gero, 5,073,271, Cl. 210-710.000.

Kempf, Thomas P.: *See*—
DeMars, Jimmy A.; Kempf, Thomas P.; and Vargas, Greg, 5,073,391, Cl. 426-231.000.

Kennedy, James T., to Southern California Edison. Substation interconnecting electrical cable conductor connecting device. 5,073,680, Cl. 174-40.0TD.

Kennedy, John F., to Ford Motor Company. Signal-to-noise ratio indicating circuit for FM receivers. 5,073,976, Cl. 455-161.000.

Kennedy, Joseph P.: *See*—
Ivan, Bela; Kennedy, Joseph P.; and Mackey, Paul W., 5,073,381, Cl. 424-487.000.

Kennedy, Richard A.: *See*—
Zarabadi, Seyed R.; Padgett, Myron G.; and Kennedy, Richard A., 5,073,975, Cl. 455-161.000.

Kent, Gary D.: *See*—
Fotinos, Nicephoros A.; and Kent, Gary D., 5,073,196, Cl. 106-287.190.

Kerlin, Harold W.: *See*—
Birch, Norman R.; Dunbar, James G.; Kerlin, Harold W.; Sheesley, Wilmer L.; and Vees, Edward C., 5,073,123, Cl. 439-188.000.

Kernforschungszentrum Karlsruhe GmbH: *See*—
Bacher, Walter; Biedermann, Hans; and Harmening, Michael, 5,073,237, Cl. 264-320.000.
Brandelik, Alexander, 5,073,756, Cl. 324-643.000.

Kerr Manufacturing Company: *See*—
Patillo, Ronald L.; and Steele, Charles E., 5,073,696, Cl. 219-233.000.

Kessler, James A.: *See*—
Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., 5,073,091, Cl. 60-222.00R.

Kevern, James D.: *See*—
Edwards, Bryan T.; Flickinger, Steven L.; Kevern, James D.; Sonner, David D.; Weber, Robert N.; and Zeiders, Jeffrey A., 5,073,046, Cl. 385-90.000.

Keyaki, Keiichi: *See*—
Hirota, Minoru; Kuse, Kazuki; and Keyaki, Keiichi, 5,072,502, Cl. 29-408.000.

Khan, Arif: *See*—
Khan, Rakib; and Khan, Arif, 5,072,701, Cl. 123-142.50E.

Khan, Rakib; and Khan, Arif. Apparatus for automatically starting engines. 5,072,701, Cl. 123-142.50E.

Kibe, Hiroshi: *See*—
Kagechika, Hiroshi; Mishima, Tadahiko; and Kibe, Hiroshi, 5,073,403, Cl. 427-38.000.

Kijima, Shizumasa: *See*—
Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, 5,073,659, Cl. 585-600.000.

Kikuchi, Hiroyoshi; Kosuge, Hiroto; and Suzuki, Syunsuke, to NDC Co., Ltd. Method for joining metallic members. 5,073,693, Cl. 219-93.000.

Kikuchi, Naoyuki: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Kikuchi, Shinichi: *See*—
Kato, Hideo; Kikuchi, Shinichi; Nakai, Hiroto; and Iwahashi, Hiroshi, 5,073,726, Cl. 307-443.000.

Kikuchi, Shoji; and Furuya, Tetsuyuki, to AMP Incorporated. Electrical connector housing having conductor-retention means. 5,073,126, Cl. 439-452.000.

Kikuchi, Shoji: *See*—
Mouri, Akihiro; Katayama, Masato; Fukui, Tetsuro; Isaka, Kazuo; Kikuchi, Shoji; and Koumura, Noboru, 5,073,791, Cl. 355-27.000.

Kikuchi, Toshiyuki; Fujii, Masaki; Abe, Mitsutoshi; and Matsuno, Yuji, to Mazda Motor Corporation. Control system for vehicle with automatic transmission with engine torque control having the hydraulic fluid temperature as a control parameter during shifting. 5,072,630, Cl. 74-858.000.

Kikutake, Jun-ichiro: *See*—
Amano, Yoshiyuki; Kikutake, Jun-ichiro; and Sugiura, Masakazu, 5,073,485, Cl. 435-7.940.

Kikuyama, Hirohisa: *See*—
Ohmi, Tadahiro; Miki, Masahiro; Kikuyama, Hirohisa; and Maeno, Matagoro, 5,073,232, Cl. 156-646.000.

Kilian, Ulrich; Gotz, Jurgen; Hainbuch, Claus-Michael; and Edenhofer, Berthold, to Daimler-Benz AG. Method of setting an assisting force in power-assisted steering. 5,072,803, Cl. 180-141.000.

Killguss, Heinz: *See*—
Mirlieb, Bernd; Baumann, Kurt; and Killguss, Heinz, 5,073,916, Cl. 378-181.000.

Kimble, Stephen E. Toy web-shooting glove. 5,072,856, Cl. 222-78.000.

Kimura, Hiroshige: *See*—
Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, 5,073,926, Cl. 379-53.000.

Kimura, Tomio: *See*—
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, 5,073,556, Cl. 514-254.000.

Kimura, Yoichi: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

King, Randall K.; and Wells, John R., to Halliburton Company. Front-discharge fluid end for reciprocating pump. 5,073,096, Cl. 417-454.000.

Kinnaird, Michael G.: *See*—
Otten, Jay G.; Parker, Edward J.; and Kinnaird, Michael G., 5,073,286, Cl. 252-97.000.

Kinne, Michael F.: *See*—
Suica, David E.; Kinne, Michael F.; and Williamson, Gary S., 5,072,834, Cl. 209-273.000.

Kinneberg, Bruce: *See*—
Gilbertson, Thomas A.; Meyers, Michael R.; and Kinneberg, Bruce, 5,072,596, Cl. 62-185.000.

Kino, Gordon S.; Chim, Stanley S. C.; and Beck, Patricia A., to Leland Stanford Junior University, The Board Of Trustees Of The. Correlation microscope. 5,073,018, Cl. 359-368.000.

Kinoshita, Hiroshi: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Kinoshita, Takao, to Canon Kabushiki Kaisha. Solid state semiconductor device. 5,073,808, Cl. 357-30.000.

Kirberg, Uwe: *See*—
Bischof, Hubert; Konigorski, Ulrich-Eugen; and Kirberg, Uwe, 5,072,804, Cl. 180-142.000.

Kirby, Alan. Apparatus for heating pipe. 5,073,108, Cl. 432-225.000.

Kishita, Hirofumi: *See*—
Konno, Hiroki; and Kishita, Hirofumi, 5,073,422, Cl. 428-40.000.

Kissei Pharmaceutical Co., Ltd.: *See*—
Kamijo, Tetsuhide; Ujiie, Arao; Tsutsumi, Naoyuki; and Tsubaki, Atsushi, 5,073,553, Cl. 514-232.800.

Kissel, Philippe: *See*—
Chuiton, Rene ; Chemtob, Maurice; and Kissel, Philippe, 5,073,715, Cl. 250-370.010.

Kitadono, Kaoru: *See*—
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

Kitagawa, Tsuneo; and Araki, Kazuhiro, to Minolta Camera Kabushiki Kaisha. Image duplicating apparatus in which user specified operational conditions are stored and used based on the detected nature of the document being copied. 5,073,794, Cl. 355-208.000.

Kitatani, Katsuji: *See*—
Makino, Naonori; Hoshi, Satoshi; Ohno, Shigeru; and Kitatani, Katsuji, 5,073,465, Cl. 430-58.000.

Kitoh, Makoto: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Kiziltug, Arif Y., to Chicago Bridge & Iron Technical Services. Wash column ice-pack bottom detection device. 5,072,600, Cl. 62-540.000.

Klaus, Benjamin, Jr.; MacKenzie, Gordon C.; and Beckerleg, Richard A., to Raytheon Company. Optical system. 5,072,890, Cl. 244-3.160.

Kleemann, Dittmar: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Klein, Robert. Golf putter. 5,072,941, Cl. 273-164.000.

Kleineke, Charles W., to Advanced Mining Systems, Inc. Mine roof bolt with resin retention and resin mixing device. 5,073,065, Cl. 405-259.600.

Kleinschmit, Peter: *See*—
Deschler, Ulrich; Kleinschmit, Peter; Wolff, Siegfried; and Tan, Ewe-Hong, 5,073,644, Cl. 556-482.000.

Klepeis, Stanley J. Liquid mixer. 5,073,033, Cl. 366-343.000.

Klimesch, Roger; Bleckmann, Gerhard; Farwerck, Karl-Peter; Schlemmer, Lothar; and Sanner, Axel, to BASF Aktiengesellschaft. Continuous preparation of solid pharmaceutical forms. 5,073,379, Cl. 424-467.000.

Kline, Jules M.; Miller, Stephen J.; and Mulaskey, Bernard F., to Chevron Research & Technology Company. Staged catalyst reforming to produce optimum octane barrel per calendar day reformate production. 5,073,250, Cl. 208-65.000.

Klingensmith, George B.; and Campbell, Randolph N., to Shell Oil Company. Process for producing mono- or biaxially drawn polyketone films. 5,073,327, Cl. 264-290.200.

Klitsner, Daniel B.; and Milsal, D'Miles E., to Discovery Toys, Inc. Modular gear and frame toy. 5,073,138, Cl. 446-103.000.

Klobucar, W. Dirk; and Kolich, Charles H., to Ethyl Corporation. Phosphonitrilic mixed esters. 5,073,284, Cl. 252-78.500.

Knabenhans, Balz: *See*—
Reddemann, Hans; von dem Hagen, Tronje; and Knabenhans, Balz, 5,073,947, Cl. 381-187.000.

Knight, Delos L., III; Panasewicz, Dale A.; and Saunders, Craig M., to Procter & Gamble Company, The. Container for heating or cooking a food product in a hot-air oven. 5,073,390, Cl. 426-113.000.

Knodel, Waldemar R.: *See*—
Beisenherz, Kurt; and Knodel, Waldemar R., 5,073,254, Cl. 209-273.000.

Knoll, Heiko-Christian: *See*—
Urban, Ernst-Gunther; and Knoll, Heiko-Christian, 5,072,641, Cl. 83-499.000.

Knorr, Raymond S., to Monsanto Company. High tenacity nylon yarn. 5,073,453, Cl. 428-373.000.

Knowlton, Barry R.; and Elgarhy, Yassin, to Trichromatic Carpet Inc. Method of enhancing the soil- and stain-resistance characteristics of polyamide and wool fabrics, the fabrics so treated, and treating compositions. 5,073,442, Cl. 428-267.000.

Ko, Wen-Jeng: *See*—
Sammons, David w.; Ko, Wen-Jeng; and Liu, Yi-Cheng, 5,073,963, Cl. 382-30.000.

Kobayashi, Goroku: *See*—
Kajiwara, Toshiro; Kobayashi, Goroku; Fukuyama, Keiji; Sano, Ko; Yano, Yojiro; and Watanabe, Keiji, 5,073,743, Cl. 313-346.00R.

Kobayashi, Isao; Hamada, Yosuke; Mori, Kenji; and Hirai, Hiromu, to Hitachi, Ltd. Sample moving apparatus, sample moving system and semiconductor manufacturing apparatus. 5,073,912, Cl. 378-34.000.

Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Taniishi, Shinnosuke; and Kamono, Takeshi, to Canon Kabushiki Kaisha. Coordinate input apparatus and a wireless input pen. 5,073,685, Cl. 178-18.000.

Kobayashi, Nobuaki: *See*—
Fukuoka, Mitsuhiro; and Kobayashi, Nobuaki, 5,073,058, Cl. 401-260.000.

Kobayashi, Seishichi: *See*—
Imazu, Katsuhiro; Aizawa, Masanori; Miyazawa, Tetsuo; Satoh, Nobuyuki; and Kobayashi, Seishichi, 5,072,605, Cl. 72-46.000.

Kobayashi, Takemi: *See*—
Numata, Kunjo; Niikura, Noriyasu; and Kobayashi, Takemi, 5,073,049, Cl. 400-54.000.

Kobayashi, Yoshiaki: *See*—
Takahashi, Mitsugu; Kobayashi, Yoshiaki; Mitsuhashi, Takao; and Yamagata, Shinji, 5,073,764, Cl. 335-16.000.

Kobayashi, Yuhei, to Sony Corporation. Tracking apparatus having movable and stationary parts. 5,073,884, Cl. 369-44.370.

Koberstein, Edgar: *See*—
Domesle, Rainer; Engler, Bernd; Koberstein, Edgar; and Schubert, Peter, 5,073,532, Cl. 502-304.000.

Kobler, Ingo: *See*—
Schneider, Josef; Fuhrmann, Hartmut; and Kobler, Ingo, 5,072,671, Cl. 101-467.000.

Kobler, Norbert: *See*—
Weisbrod, Norbert; and Kobler, Norbert, 5,072,669, Cl. 101-142.000.

Kobori, Takeo; and Tunemoto, Daiei, to Sagami Chemical Research Center. Cephalosporin compounds. 5,073,551, Cl. 514-206.000.

Koch, Steven R.: *See*—
Zinser, Richard L.; Koch, Steven R.; and Toy, Raymond L., 5,073,940, Cl. 381-47.000.

Koch, Wolfgang: *See*—
Brandl, Erich; Koch, Wolfgang; and Zitz, Alfred, 5,072,994, Cl. 299-67.000.

Kochendorfer, Claus: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Kochendorfer, Lore: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Kodet, John. Display sign having coacting display rollers and drive belt attachment. 5,072,534, Cl. 40-524.000.

Koehler, Winfried; Hornauer, Klaus-Peter; Kopp, Reiner; Baldner, Klaus; and Wuestefeld, Frank, to Dornier GmbH. Peening shot curving. 5,072,606, Cl. 72-53.000.

Koerts, Kees: *See*—
oosterhuis, Nicholaas M. G.; and Koerts, Kees, 5,073,496, Cl. 435-289.000.

Kogler, Christopher A.: *See*—
Kogler, Stephen D., 5,072,459, Cl. 2-158.000.

Kogler, Stephen D., to Kogler, Stephen D.; and Kogler, Christopher A. Precurled mitten. 5,072,459, Cl. 2-158.000.

Kohayakawa, Hiromasa: *See*—
Suzuki, Kensuke; and Kohayakawa, Hiromasa, 5,073,796, Cl. 355-215.000.

Kohl, Willibald E.; and Scholl, Thomas, to Lonza Ltd. Preparations containing L-carnitine. 5,073,376, Cl. 424-451.000.

Kohonen, Raimo O.: *See*—
Immonen, Pasi H.; and Kohonen, Raimo O., 5,073,264, Cl. 210-404.000.

Koide, Hiroshi: *See*—
Takahashi, Yoshitaka; Koide, Hiroshi; Gotoh, Hiroshi; Emoto, Masami; and Honda, Syuichi, 5,073,888, Cl. 369-112.000.

Koide, Shinichi: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.

Kojima, Masakatu: *See*—
Yamashita, Youji; and Kojima, Masakatu, 5,073,229, Cl. 156-605.000.

Kojima, Yasuhiro; Maeda, Hiroshi; Nishiyama, Satoshi; and Perry, David A., to Pfizer Inc. Antiparasitic agent. 5,073,567, Cl. 514-450.000.

Kok, Piet; and Van der Eycken, Erik V., to AGFA-Gevaert, N.V. Quick acting hardener for photographic gelatin layers. 5,073,480, Cl. 430-623.000.

Kokaku, Yuichi: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Kolbenschmidt Aktiengesellschaft: *See*—
Pfestorf, Harald, 5,073,213, Cl. 148-262.000.

Kolchinsky, Abel E., to Sterling Hydraulics, Inc. Bidirectional cartridge valve. 5,072,752, Cl. 137-493.000.

Kolich, Charles H.: *See*—
Klobucar, W. Dirk; and Kolich, Charles H., 5,073,284, Cl. 252-78.500.

Kolton, Chester; and Spater, Stuart S., to B & G Plastics, Inc. Plural garment support hanger. 5,072,866, Cl. 223-91.000.

Komatsu, Fumiaki: *See*—
Miyao, Hidehiko; Shiotsuki, Masao; Kawamura, Shigeyoshi; and Komatsu, Fumiaki, 5,073,305, Cl. 252-633.000.

Komatsuzaki, Shigeki: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.

Kompelien, Arlon D., to Honeywell Inc. Flame detector using a discrete fourier transform to process amplitude samples from a flame signal. 5,073,769, Cl. 340-578.000.

Kondo, Takashi. Apparatus and method for obtaining hot beverage extract liquid. 5,072,661, Cl. 99-296.000.

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Kondoh, Tadami: *See*—
Hirabayashi, Kazuo; Kondoh, Tadami; Nishijima, Hiroaki; Inoue, Shinichi; Adachi, Kouji; Igarashi, Fumiho; and Wakai, Toshio, 5,073,673, Cl. 585-415.000.

Kondou, Masahiko, to Hitachi, Ltd. Semiconductor structure and semiconductor laser device. 5,073,893, Cl. 372-45.000.

Kone Elevator GmbH: *See*—
Kulju, Hannu, 5,073,706, Cl. 250-221.000.

Konica Corporation: *See*—
Haneda, Satoshi; Fukuchi, Masakazu; Matsuo, Shunji; and Morita, Shizuo, 5,073,801, Cl. 355-311.000.
Katsuta, Tsuyoshi; and Shiraishi, Yasuhito, 5,073,829, Cl. 358-498.000.

Konigorski, Ulrich-Eugen: *See*—
Bischof, Hubert; Konigorski, Ulrich-Eugen; and Kirberg, Uwe, 5,072,804, Cl. 180-142.000.

Koninsky, Peter M.: *See*—
Steigerwald, Robert L.; Koninsky, Peter M.; and Franz, Gerhard A., 5,073,848, Cl. 363-65.000.

Konishi, Junichi: *See*—
Kosaka, Daisuke; and Konishi, Junichi, 5,073,815, Cl. 357-67.000.

Konishi, Katsuji: *See*—
Kusuda, Hidefumi; Konishi, Katsuji; and Ueda, Koichi, 5,073,477, Cl. 430-287.000.

Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, to Canon Kabushiki Kaisha. Image processing system. 5,073,965, Cl. 382-47.000.

Konno, Hiroki; and Kishita, Hirofumi, to Shin-Etsu Chemical Co., Ltd. Pressure-sensitive adhesive structure. 5,073,422, Cl. 428-40.000.

Kool, Pieter: *See*—
Diepenhorst, Pieter C.; Kool, Pieter; and Nouws, Jacobus A. M., 5,073,647, Cl. 562-27.000.

Kopinski, Gerald P.: *See*—
Baer, Patrick H.; Connolly, Timothy F.; Kopinski, Gerald P.; Rowley, Curtis E.; and Senkow, Anthony W., 5,072,613, Cl. 73-119.00R.

Kopolow, Stephen L.; and Burlant, William J., to ISP Investments Inc. Preparation of discrete microdroplets of an oil in water. 5,073,296, Cl. 252-312.000.

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Koehler, Winfried; Hornauer, Klaus-Peter; Kopp, Reiner; Baldner, Klaus; and Wuestefeld, Frank, 5,072,606, Cl. 72-53.000.

Koppernaes, Christian; Nolet, Stephen G.; and Fanucci, Jerome P., to American Composite Technology, Inc. Method and apparatus for wetting fiber reinforcements with matrix materials in the pultrusion process using continuous in-line degassing. 5,073,413, Cl. 427-356.000.

Korany, Franklyn J.: *See*—
Craves, Roderick M.; Korany, Franklyn J.; and Jacobson, Mark J., 5,073,326, Cl. 264-278.000.

Korban, Fouad F.: *See*—
Millman, Norman A.; and Korban, Fouad F., 5,072,977, Cl. 292-336.300.

Korber AG: *See*—
Heitmann, Uwe, 5,072,741, Cl. 131-84.100.
Heitmann, Uwe, 5,072,742, Cl. 131-84.300.

Kore, Haruhisa: *See*—
Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, 5,072,966, Cl. 280-730.000.

Korner Chemieanlagenbau Gesellschaft m.b.H.: *See*—
Korner, Hans; and Wurm, Franz, 5,073,244, Cl. 204-242.000.

Korner, Hans; and Wurm, Franz, to Korner Chemieanlagenbau Gesellschaft m.b.H. Self-supporting receptacle, especially for use as an electrolysis cell. 5,073,244, Cl. 204-242.000.

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Webb, Edward H., 5,072,704, Cl. 123-179.100.

Kortbeek, Andras G. T. G.: *See*—
Scheffer, Bob; and Kortbeek, Andras G. T. G., 5,073,661, Cl. 585-640.000.

Korvas, Albin: *See*—
Habrovansky, Josef; Boltnar, Vincenc; Rybka, Jiri ; Korvas, Albin; and Svajda, Jindrich, 5,072,528, Cl. 36-43.000.

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Kosuge, Hiroto: *See*—
Kikuchi, Hiroyoshi; Kosuge, Hiroto; and Suzuki, Syunsuke, 5,073,693, Cl. 219-93.000.

Kotch, Robert J.: *See*—
Delgado, Steve R.; Kotch, Robert J.; and Hall, Frank, 5,072,795, Cl. 175-228.000.

Kotera, Masahide: *See*—
Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 5,073,965, Cl. 382-47.000.

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Koumura, Noboru: *See*—
Mouri, Akihiro; Katayama, Masato; Fukui, Tetsuro; Isaka, Kazuo; Kikuchi, Shoji; and Koumura, Noboru, 5,073,791, Cl. 355-27.000.

Koura, Soushichi: *See*—
Muroi, Kishiro; and Koura, Soushichi, 5,072,983, Cl. 296-37.130.

Kover, Alexander: *See*—
Wu, Edwin S.; and Kover, Alexander, 5,073,560, Cl. 514-278.000.

Koya, Keizo; and Idota, Yoshio, to Fuji Photo Film Co., Ltd. Method of forming an image by silver salt diffusion transfer. 5,073,473, Cl. 430-247.000.

Kozakura, Nobuto: *See*—
Maruyama, Masao; Kozakura, Nobuto; Nakakubo, Katsuya; and Okamoto, Nobuo, 5,073,149, Cl. 474-104.000.

Kraeutler, Bernard, to Nergeco (SA). Device for facilitating the folding of a raisable curtain. 5,072,767, Cl. 160-84.100.

Kraft General Foods: *See*—
Kuss, George, 5,073,398, Cl. 426-613.000.

Kraft, Morton L.: *See*—
Gupta, Raj K.; Kraft, Morton L.; and Coleman, William B., 5,073,273, Cl. 210-760.000.

Krahn, Darren L.; and Wible, John E., to Caterpillar Industrial Inc. Control system for a fluid operated jack. 5,072,648, Cl. 91-52.000.

Krambeck, Frederick J.: *See*—
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, 5,073,665, Cl. 585-722.000.

Krambrock, Wolfgang, to AVT Anlagen - und Verfahrenstechnik GmbH. Rotary slide valve. 5,072,758, Cl. 137-625.470.

Krassow, Thomas: *See*—
Mitchell, Winalee G.; Mitchell, James; Plotka, Michael; Van Streader, Gary; and Krassow, Thomas, 5,072,687, Cl. 118-37.000.

Kreh, Robert P., to W. R. Grace & Co. - Conn. Method of inhibiting corrosion and scale formation in aqueous systems. 5,073,339, Cl. 422-15.000.

Kreinberg, Earl R.: *See*—
Daly, John K.; Kreinberg, Earl R.; and Adcock, Marty E., 5,073,127, Cl. 439-473.000.

Krivoy, Raul: *See*—
Long, Martin W.; Fry, Charles B.; Rix, David M.; and Krivoy, Raul, 5,072,709, Cl. 123-446.000.

Krog, Ann: *See*—
Giezendanner, Corinna C.; Krog, Ann; Valdes, Nancy; and DiSomma, Joseph, 5,073,364, Cl. 424-63.000.

Kroger, Uwe: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Krohn, David A.; and Vinarub, Edmond I., to 3M Fiber Optic Products, Inc. Fiber optic displacement measuring apparatus. 5,073,027, Cl. 356-373.000.

Kromrey, Robert V., to United Technologies Corporation. Thermal barrier for high temperature molding. 5,073,443, Cl. 428-313.700.

Kronos (U.S.A.), Inc.: *See*—
Hartmann, Achim, 5,073,355, Cl. 423-79.000.

Krowl, Thomas R.; and Scheffer, Norman, to BNZ Materials, Inc. Insulating material containing pitch based graphite fiber. 5,073,199, Cl. 106-797.000.

Kruck, Thomas; Behrendorf, Norbert; and Faubel, Heiko, to Siemens Aktiengesellschaft. CVD-compatible tungsten halogen phosphine complex compounds and methods for the production thereof. 5,073,645, Cl. 556-13.000.

Krueger, Mark: *See*—
Masterson, Anthony; and Krueger, Mark, 5,073,851, Cl. 395-425.000.

Kruger, Horst: *See*—
Gschwender, Alois; Walther, Detlef; Kruger, Horst; and Pawlischta, Rudiger, 5,073,736, Cl. 310-88.000.

Kruse, Michael; and Riedel, Hans-Dietrich, to Otis Elevator Company. Escalator/people mover bearing. 5,072,821, Cl. 198-327.000.

Kubo, Kenichi: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Kubo, Seiji: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.

Kubota Corporation: *See*—
Hama, Masaaki; and Inoue, Junichirou, 5,072,814, Cl. 192-3.570.

Kubota, Kazunori; and Yamazaki, Hideo, to Ricoh Company, Ltd. Finisher for an image forming apparatus. 5,072,920, Cl. 270-53.000.

Kuekenhoehner, Thomas: *See*—
Frickel, Fritz-Frieder; Kuekenhoehner, Thomas; Rendenbach-Mueller, Beatrice; Weifenbach, Harald; and Teschendorf, Hans-Juergen, 5,073,563, Cl. 514-365.000.

Kugimiya, Koichi: *See*—
Hirota, Ken; Satomi, Mitsuo; and Kugimiya, Koichi, 5,073,214, Cl. 148-306.000.

Kuhman, Daniel E.: *See*—
Jansen, Frank; and Kuhman, Daniel E., 5,073,785, Cl. 346-1.100.

Kuhn, Franz J.: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 5,073,671, Cl. 548-348.000.

Kuhne, Viktor, to J. M. Voith GmbH. Elastic clutch. 5,072,818, Cl. 192-106.100.

Kulju, Hannu, to Kone Elevator GmbH. Procedure and apparatus for detecting objects moving at varying speeds within a certain area. 5,073,706, Cl. 250-221.000.

Kumar, Anand: *See*—
Chapoteau, Eddy; Czech, Bronislaw P.; Gebauer, Carl R.; Leong, Koon-Wah; and Kumar, Anand, 5,073,501, Cl. 436-74.000.

Kumar, Ravi: *See*—
Guro, David E.; Kumar, Ravi; Nicholas, David M.; and Roth, Gary S., 5,073,356, Cl. 423-415.00A.

Kunk, LaVern: *See*—
Pingry, Larry J.; and Kunk, LaVern, 5,072,676, Cl. 111-63.000.

Kurachi, Nobuhide, to Nippon Seiko Kabushiki Kaisha. Vehicle transmission. 5,073,159, Cl. 475-216.000.

Kurek, Paul R.: *See*—
Arena, Blaise J.; and Kurek, Paul R., 5,073,654, Cl. 585-467.000.

Kurihara, Akira, to Jakob Schlaepfer & Co. AG. Apparatus for forming a pattern of articles on a substrate. 5,073,223, Cl. 156-362.000.

Kurita, Mitsuru: *See*—
Sugiura, Takashi; and Kurita, Mitsuru, 5,073,959, Cl. 382-22.000.

Kuroki, Yuzuru: *See*—
Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, 5,073,887, Cl. 369-100.000.

Kurosawa, Haruo: *See*—
Sirai, Akira; Yamamoto, Mitsuyosi; and Kurosawa, Haruo, 5,073,128, Cl. 439-585.000.

Kurosawa, Ryuichi: *See*—
Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, 5,072,813, Cl. 188-322.150.

Kurosawa, Yoshi: *See*—
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.

Kurusu, Hidetoshi: *See*—
Ona, Isao; Ozaki, Masaru; and Kurusu, Hidetoshi, 5,073,275, Cl. 252-8.600.

Kurz, Fredrik W. A. Method of preparing building materials. 5,073,198, Cl. 106-791.000.

Kuse, Kazuki: *See*—
Hirota, Minoru; Kuse, Kazuki; and Keyaki, Keiichi, 5,072,502, Cl. 29-408.000.

Kuss, George, to Kraft General Foods. Natural flavored vegetable oil. 5,073,398, Cl. 426-613.000.

Kust, Cyril A., to American Cyanamid Company. Substituted phthalimido cyclohexanecarboxamides and compositions thereof for enhancing growth of hybrid tea rose plants. 5,073,190, Cl. 71-95.000.

Kusuda, Hidefumi; Konishi, Katsuji; and Ueda, Koichi, to Nippon Paint Co., Ltd. Photosensitive resin composition. 5,073,477, Cl. 430-287.000.

Kuyzin, Gregg S.; and Stoll, John R., to BASF Corporation. Polyurethane-polyisocyanurate structural rim systems with enhanced processing. 5,073,576, Cl. 521-99.000.

Kuze, Katsuaki: *See*—
Nose, Katsuhiko; Kuze, Katsuaki; and Tatsuta, Hideaki, 5,073,455, Cl. 428-411.100.

Kvita, Petr: *See*—
Bruttel, Beat; and Kvita, Petr, 5,073,295, Cl. 252-301.190.

Kwan, David C. K.: *See*—
Lebensfeld, Steven; Goldberg, Harvey; Kwan, David C. K.; and Wai, Ma H., 5,073,140, Cl. 446-297.000.

Kwon, Oh-Hyun; Jang, Taek-Yong; Shin, Jung-Hyun; and Choi, Won-Taek, to Samsung Electronics Co., Ltd. Fabrication method of contact window in semiconductor device. 5,073,510, Cl. 437-40.000.

Kwon, Oh K.: *See*—
Malhi, Satwinder; Kwon, Oh K.; and Mahant-Shetti, Shivaling S., 5,073,117, Cl. 439-71.000.

Kyodo Printing Co., Ltd.: *See*—
Fujita, Minoru; Sugimoto, Tadahide; and Takagi, Yutaka, 5,073,787, Cl. 346-135.100.

L.M. & L. Corporation: *See*—
Mabie, Norman H., 5,073,155, Cl. 474-256.000.

Lababia Del Fresno, Miguel, to Oficina de Investigacion Agrupada. Toaster. 5,072,665, Cl. 99-391.000.

Laboratorios Del Dr. Esteve, S.A.: *See*—
Pinol, Augusto C.; Constansa, Jordi F.; and Corominas, Juan P., 5,073,646, Cl. 548-953.000.

Labsystems OY: *See*—
Partanen, Paul; Seppanen, Helena; and Harjunmaa, Hannu, 5,073,346, Cl. 422-99.000.

Lafayette Applied Chemistry, Inc.: *See*—
Whistler, Roy L., 5,073,387, Cl. 426-7.000.

Laghi, Aldo A. Double actuator with bypass lines for synchronized movement. 5,072,649, Cl. 91-171.000.

Lai, Hui-Chen J.: *See*—
Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., 5,073,677, Cl. 800-205.000.

Laing, Doerte; Laing, Karsten; and Ludin, Ludwig. Hot water priming device. 5,072,717, Cl. 126-362.000.

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Laing, Doerte; Laing, Karsten; and Ludin, Ludwig, 5,072,717, Cl. 126-362.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Larue, Jean-Pierre; Marie, Bruno; Marot, Christine; Ougarane, Lahcen; and Van der Have, Philippe, 5,073,897, Cl. 372-59.000.

L'Air Liquide, Societe Anonyme pour l'Etudeet l'Exploitation des Procedes Georges Claude: *See*—
Virey, Franck; and Goumy, Daniel, 5,073,182, Cl. 65-84.000.

Laitram Corporation, The: *See*—
Greve, Christopher G.; and O'Connor, Ronald M., 5,072,640, Cl. 83-208.000.

Lakey, Lawrence D. Method of feeding articles into a horizontal wrapping machine. 5,072,575, Cl. 53-450.000.

Lam, Kin S.: *See—*
Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,073,633, Cl. 540-545.000.

Lamb, Joyce D.: *See—*
Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., 5,073,670, Cl. 585-320.000.

Lambert, George L., III: *See—*
Pipis, George C.; and Lambert, George L., III, 5,072,848, Cl. 220-241.000.

Lancelot, Charles J.; Shaw, Anthony F.; and Tate, Edward O., Jr., to Rubbermaid Incorporated. Foldable plastic product. 5,073,428, Cl. 428-67.000.

Landers, Donna L.: *See—*
Coyner, Sherri A.; and Landers, Donna L., 5,073,844, Cl. 362-156.000.

Lang, Marc, to Ciba-Geigy Corporation. Tetrazolyl substituted benzonitriles and anti-tumor use thereof. 5,073,574, Cl. 514-381.000.

Lang, Mark G.: *See—*
Fuller, Everett J.; Luttinger, Lionel B.; and Lang, Mark G., 5,073,354, Cl. 423-24.000.

Langer, Michael; and Schommers, Joachim, to Andreas Stihl. Membrane carburetor for an internal combustion engine of a handheld portable tool. 5,073,307, Cl. 261-35.000.

Lanxide Technology Company, LP: *See—*
Newkirk, Marc S.; and Zwicker, Harry R., 5,073,527, Cl. 501-127.000.

Lapowsky, Andrew, to Jones Environics Ltd. Heat exchanger core construction. 5,072,790, Cl. 165-166.000.

Large Scale Biology Corporation: *See—*
Anderson, Norman G., 5,073,495, Cl. 435-284.000.

Larson, Alan R.: *See—*
Gates, Jackson; Hawkins, Robert L.; Larson, Alan R.; Perove, David A.; and Rudella, Michael A., 5,073,819, Cl. 358-107.000.

Larue, Jean-Pierre; Marie, Bruno; Marot, Christine; Ougarane, Lahcen; and Van der Have, Philippe, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Gases to be used for CO_2 laser operation and process of operating with CO_2 laser. 5,073,897, Cl. 372-59.000.

Laser Labs, Inc.: *See—*
Marcin, Edward, 5,073,707, Cl. 250-223.00R.

Lask, Gert-Wilhelm, to Applied Industrial Materials Corporation AIMCOR. Apparatus for making green briquettes for forming Si, SiC or ferrosilicon. 5,073,107, Cl. 432-103.000.

Lathrop, Stephen C.; Woodruff, Keith; and Morris, Edward, to Procter & Gamble Company, The. Dispensing container having capillary pressure compensating valve. 5,073,057, Cl. 401-206.000.

Latif, Linda S.: *See—*
Campbell, Christopher J.; Latif, Linda S.; and Graboyes, Herman, 5,073,162, Cl. 493-396.000.

Latouche-Halle, Jean P.: *See—*
Kaitandjian, Michel; Pradat, Philippe J.; Latouche-Halle, Jean P.; and Falipou, Alain M., 5,073,751, Cl. 320-1.000.

Lau, John W.: *See—*
Enloe, Jack H.; Lau, John W.; and Rice, Roy W., 5,073,526, Cl. 501-96.000.

Lauke, Harald; Schuermann, Gregor; Sandig, Hartmut; and Loerzer, Thomas, to BASF Aktiengesellschaft. Production of plate-like, sheet-like or tape-like materials and of sensitized lithographic printing plates. 5,073,475, Cl. 430-278.000.

Lauterbach, Gerald: *See—*
Huellmann, Michael; Becker, Rainer; Janitschke, Lothar; Lauterbach, Gerald; Barth, Wolfgang; and Jansen, Klaas, 5,073,538, Cl. 512-9.000.

Laver, Hugh S.: *See—*
Vieira, Eric; and Laver, Hugh S., 5,073,448, Cl. 428-331.000.

Lavorel, Gerard: *See—*
Casset, Jacques; and Lavorel, Gerard, 5,072,872, Cl. 226-176.000.

Lawrence Paper Company, The: *See—*
Meeks, William R., 5,072,507, Cl. 29-568.000.

Lawrie, George, to Singer Company N.V., The. Stitch width tracker for sewing machine. 5,072,679, Cl. 112-443.000.

Le, An V.: *See—*
Matyas, Stephen M.; Johnson, Donald B.; Le, An V.; Martin, William C.; Prymak, Rostislaw; Rohland, William S.; and Wilkins, John D., 5,073,934, Cl. 380-30.000.

Lebacq, Philippe, to Bioprobe Systems. Method of staining nucleic acids detected by non-radioactive labelling and kit of reactants for carrying out the method. 5,073,483, Cl. 435-6.000.

Lebensfeld, Steven; Goldberg, Harvey; Kwan, David C. K.; and Wai, Ma H., to Lebensfeld, Steven; Goldberg, Harvey; Kwan, David C. K.; and Wai, Ma H. Toy action figures and speech and sound effects accessory therefor. 5,073,140, Cl. 446-297.000.

LeBlanc, Leo J.; and Johnson, Bruce R. Vapor vent valve. 5,072,912, Cl. 251-63.500.

Lecocq, Jean-Luc, to Automobiles Peugeot; Automobiles Citroen; and Regie Nationale des Usines Renault. Device for receiving information travelling on two capacitively coupled information transmission lines, in particular for a motor vehicle. 5,073,902, Cl. 375-36.000.

Lee, John H., to Minnesota Mining and Manufacturing Company. Key programmed transcutaneous electric stimulator. 5,072,730, Cl. 128-421.000.

Lee, Kiu-Seung, to Du Pont de Nemours, E. I., and Company. Poly(vinyl pyrrolidone)/p-phenylene terephthalamide composite fibers (PVP/PPD-T). 5,073,440, Cl. 428-224.000.

Lee, Ruojia R., to Micron Technology, Inc. Blanket CMOS channel-stop implant. 5,073,509, Cl. 437-34.000.

Lee, Soo-Cheol, to Samsung Electronics Co., Ltd. Manufacture of a nonvolatile semiconductor memory device having a sidewall select gate. 5,073,513, Cl. 437-43.000.

Lee, Yun W.: *See—*
Cook, C. Edgar; Wani, Mansukh C.; Lee, Yun W.; Reel, Jerry R.; and Rector, Douglas, 5,073,548, Cl. 514-169.000.

Leemhuis, Richard S.: *See—*
Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., 5,073,091, Cl. 60-222.00R.

Lefere, Genevieve: *See—*
Melec, Didier; You, Claudine; Lefere, Genevieve; and Peres, Claudine, 5,073,441, Cl. 428-254.000.

Lefiles, James H.: *See—*
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Lefumeux, Alain; and Raynal, Serge, to Societe Nationale des Poudres et Explosifs. Composite materials with lubricating properties, process for their manufacture and antierosive components for a barrel weapon system which consists of these materials. 5,072,672, Cl. 102-435.000.

Lehr, Erich: *See—*
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 5,073,671, Cl. 548-348.000.

Leiberoth-Leden, Bernd; and Norgauer, Rainer, to Robert Bosch GmbH. Engine control device. 5,072,708, Cl. 123-399.000.

Leibig, Wilhelm, to Biotecnologia y Derivados de Morelos, Sa De CV. Low pressure system for extraction of soluble matter from fibrous material. 5,073,200, Cl. 127-2.000.

Leifeld, Ferdinand; and Temburg, Josef, to Trutzschler GmbH & Co. KG. Fiber bale opener with blow nozzle. 5,072,490, Cl. 19-80.00R.

Leifeld GmbH & Co.: *See—*
Bichel, Joachim; and Temmann, Robert, 5,072,509, Cl. 29-892.300.

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Kino, Gordon S.; Chim, Stanley S. C.; and Beck, Patricia A., 5,073,018, Cl. 359-368.000.

Lemforder Metallwaren AG: *See—*
Ratzokwski, Elke; and Wagener, Keit, 5,073,145, Cl. 464-157.000.

Lemmer, Josef, to H. Maurer & Sohne Rauch-Und Warmetechnik. Accessory device for a sausage stuffer. 5,073,141, Cl. 452-30.000.

Lendi, Jurg: *See—*
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Lenhart, Brian P., Jr.: *See—*
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Leonard, Henry A.; and Schaffer, Charles W., to Birmingham Bolt Company. Method and apparatus for retorquing an installed mine roof bolt. 5,073,064, Cl. 405-259.600.

Leonard, Warren J.; Wolf, Julie B.; and Halden, Nancy F., to United States of America, Health and Human Services. Assay for *Mycoplasma fermentans*. 5,073,486, Cl. 435-19.000.

Leone, John. Apparatus for texturing bridge decks, runways and the like. 5,073,062, Cl. 404-75.000.

Leong, Helen C.: *See—*
Katz, Martin; Leong, Helen C.; and Cheng, Chung-Heng, 5,073,365, Cl. 424-489.000.

Leong, Koon-Wah: *See—*
Chapoteau, Eddy; Czech, Bronislaw P.; Gebauer, Carl R.; Leong, Koon-Wah; and Kumar, Anand, 5,073,501, Cl. 436-74.000.

LeSota, Stanley, to Rohm and Haas Company. Mildew resistant paint compositions comprising an isothiazolone and a water-insoluble copper compound, articles, and methods. 5,073,582, Cl. 524-44.000.

Leung, Pak S.; and Goddard, Errol D., to First Brands Corporation. Antifreeze composition concentrate containing oxyalkylene compound and an organic phosphate surface modifier compound. 5,073,283, Cl. 252-78.500.

Lever Brothers Company, Division of Conopco, Inc.: *See—*
Hessel, John F.; Aronson, Michael P.; Cardinali, Martin S.; and Kaiserman, Howard B., 5,073,292, Cl. 252-174.120.
Liberati, Patricia; McCown, Jack T.; Aronson, Michael; and van de Pas, Johannes C., 5,073,285, Cl. 252-94.000.

Levine, Mark, to General Automotive Specialty Co., Inc. Fuse holder. 5,073,131, Cl. 439-621.000.

Lexmark International, Inc.: *See—*
Diaz, Arthur F.; and Wollmann, Daphne L., 5,073,469, Cl. 430-110.000.

Li, Tingye: *See—*
Giles, Clinton R.; Li, Tingye; and Wood, Thomas H., 5,073,981, Cl. 359-174.000.

Liao, Ching-Fu, to Hseng Chee Enterprise PTE, Ltd. Integral sliding member of a slide fastener and the molding device thereof. 5,073,103, Cl. 425-545.000.

Liberati, Patricia; McCown, Jack T.; Aronson, Michael; and van de Pas, Johannes C., to Lever Brothers Company, Division of Conopco, Inc. Stably suspended organic peroxy bleach in a structured aqueous liquid. 5,073,285, Cl. 252-94.000.

Liechty, Deryll, to Micro-Precision Operations, Inc. Method for assembling a retainer ring onto an article. 5,072,505, Cl. 29-450.000.

Lienard, Jean, to Usines et Acieries de Sambre et Meuse. Bogie with a deformable underframe including an oblique faced friction wedge and direct engagement between bolster and side-frame. 5,072,673, Cl. 105-198.200.

Lieu, Khuong B.: *See*—
Vensko, George; Lieu, Khuong B.; Meloche, Steven A.; and Potter, John C., 5,073,939, Cl. 381-43.000.
Lifer, Sherryl L.; Marshall, Winston S.; Mohamadi, Fariborz; Reel, Jon K.; Simon, Richard L.; Steinberg, Mitchell I.; and Whitesitt, Celia A., to Eli Lilly and Company. Angiotensin II antagonist 1,3-imidazoles and use thereas. 5,073,566, Cl. 514-381.000.
Ligh, Jone Y. Differential pressure regulator. 5,072,749, Cl. 137-116.500.
Lightning Eliminators & Consultants, Inc.: *See*—
Carpenter, Roy B., Jr., 5,073,678, Cl. 174-2.000.
Liljegren, Said D. Building structure having stacked wooden beam walls. 5,072,559, Cl. 52-233.000.
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Freeman, Gerald C.; and Lilly, Norman, 5,072,799, Cl. 177-154.000.
Lin, Fu-Tung. Faucet having angularly rotatable spout. 5,072,757, Cl. 137-615.000.
Lin, I-Chien. Valve assembly. 5,072,751, Cl. 137-429.000.
Lin, Ming I. Safety device for halogen light. 5,073,846, Cl. 362-263.000.
Lin, Shuh-Chin. Structure of a carton sealing sticker and cutter. 5,073,228, Cl. 156-523.000.
Lincoln, Frank; and Slack, Victor, to AMP Incorporated. Power distribution unit. 5,073,120, Cl. 439-92.000.
Lindberg, Paul Jorn: *See*—
Lindberg, Poul J.; and Dissing, Hans, 5,073,020, Cl. 351-106.000.
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Lindsay, Richard O.: *See*—
Kelly, Michael C.; and Lindsay, Richard O., 5,073,875, Cl. 367-38.000.
Line, Henri, to Helis. Machine for milling the ends of ingots or slabs. 5,073,069, Cl. 409-197.000.
Lingwall, David F. Camera support. 5,073,788, Cl. 354-81.000.
Lion Corporation: *See*—
Arima, Masatoshi; Nishizawa, Hiroaki; Takeuchi, Keiji; Deura, Hiroshi; and Ishida, Keiichiro, 5,073,545, Cl. 514-27.000.
Lippman, Myron E. Apparatus for treating glaucoma. 5,073,163, Cl. 604-9.000.
Little, John C.; and Wilson, Charles A., to Dow Chemical, The. Preparation of 2,3-difluoro-5-(trifluoromethyl)pyridine. 5,073,637, Cl. 546-345.000.
Littleproud, Antony; and Hill, David, to Seal Technology Systems. Valve stem assembly. 5,072,950, Cl. 277-9.500.
Littman, Jon E.: *See*—
Scozzafava, Michael; Tang, Ching W.; and Littman, Jon E., 5,073,446, Cl. 428-323.000.
Liu, Jay J.; Scharr, Thomas A.; and Lytle, William H., to Motorola, Inc. Device for solder removal. 5,072,873, Cl. 228-264.000.
Liu, Yi-Cheng: *See*—
Sammons, David w.; Ko, Wen-Jeng; and Liu, Yi-Cheng, 5,073,963, Cl. 382-30.000.
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Cole, Herbert S., Jr.; and Liu, Yung S., 5,073,814, Cl. 357-54.000.
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LK Limited: *See*—
Stott, Christopher; and Salt, Howard T., 5,072,522, Cl. 33-503.000.
Lloyd, Cynthia A., to Athens Research and Technology, Inc. Rapid assay for functional human α_1-proteinase inhibitor. 5,073,487, Cl. 435-23.000.
Locke, Michael E., to International Business Machines Corporation. Multifrequency detection. 5,073,941, Cl. 381-47.000.
Lodrick, Lester B. Releasably mountable billiard/pool cue holder. 5,072,908, Cl. 248-231.800.
Loerzer, Thomas: *See*—
Lauke, Harald; Schuermann, Gregor; Sandig, Hartmut; and Loerzer, Thomas, 5,073,475, Cl. 430-278.000.
Logsdon, Duane D., to Logsdon Foundation, The. Movable fitting members for use with drain fittings. 5,072,461, Cl. 4-295.000.
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Lokken, Ernest C. Cutting height guage. 5,072,577, Cl. 56-208.000.
Long, Joseph F.: *See*—
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Long, Martin W.; Fry, Charles B.; Rix, David M.; and Krivoy, Raul, to Cummins Engine Co., Inc. Fuel injection for an internal combustion engine. 5,072,709, Cl. 123-446.000.
Lonza Inc.: *See*—
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Lonza Ltd.: *See*—
Kohl, Willibald E.; and Scholl, Thomas, 5,073,376, Cl. 424-451.000.
Loomie, Leo S. Method and apparatus for conveying and tensioning a length of sheet material. 5,072,527, Cl. 34-153.000.
Lopperi, Esko, to Safematic Ltd. Liquid-flushed seal for rotating shaft with vacuum providing leakage controlling choke in flushing liquid supply conduit. 5,072,949, Cl. 277-3.000.
Loral Aerospace Corp.: *See*—
Boss, Harold O., 5,072,982, Cl. 294-103.100.
L'Oreal: *See*—
Vayssie, Charles; Bauer, Daniel; Richard, Francoise; and Junino, Alex, 5,073,174, Cl. 8-406.000.
Lorett, Jerzy A., to BW/IP International, Inc. Reduction of transient thermal stresses in machine components. 5,072,608, Cl. 72-364.000.
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Los, Marinus, to American Cyanamid Company. 5-thioxo-2-imidazolinyl benzoic acids, esters, salts & related compounds, and use thereof as herbicidal agents. 5,073,186, Cl. 71-92.000.
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Loucks, Bryan E., to Greyhawk Systems, Inc. High-efficiency polarized light source. 5,073,830, Cl. 359-495.000.
Lowbner, Hugh G. Brightpen/pad II. 5,073,770, Cl. 340-706.000.
Lowder, James E.; Shinn, Ronald R.; and Baker, John L., to Eagle-Picher Industries, Inc. Motion multiplier for use with extendable boom fork lift vehicle. 5,072,588, Cl. 60-571.000.
Lowrey, Tyler A.: *See*—
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Luhrsen, Ernst; Schuler, Andreas; and Hintzen, Ullrich, to Didier-Werke AG. Carbon-containing wearable refractory parts. 5,072,864, Cl. 222-600.000.
Luk Lamellen Und Kupplungbau GmbH: *See*—
Friedman, Oswald; Elison, Hans-Dieter; and Jackel, Johann, 5,073,143, Cl. 464-68.000.
Luke, John A.; Case, Paul D.; and Hemsley, Stephen R., to British-American Tobacco Company Limited. Relating to the making of smoking articles. 5,072,744, Cl. 131-375.000.
Lumonics Inc.: *See*—
Reid, John; Brimacombe, Robert K.; and Williams, Edward S., 5,073,896, Cl. 372-59.000.
Lund, Earl A. E.: *See*—
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Lunzer, Lawrence J.; and Jacobsen, Carl D., to Graco Inc. Electrostatic spray applicator with two-channel optical monitoring system. 5,073,709, Cl. 250-226.000.
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Fuller, Everett J.; Luttinger, Lionel B.; and Lang, Mark G., 5,073,354, Cl. 423-24.000.
Luxton, Grenville G. H.: *See*—
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Lynam, Niall R., to Donnelly Corporation. Anti-scatter, ultraviolet protected, anti-misting, electro-optical assemblies. 5,073,012, Cl. 359-265.000.
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Lyons, Jeffrey, to Delaware Ribbon Manufacturers, Inc. Apparatus for making decorative bows. 5,072,865, Cl. 223-46.000.
Lyons, Robert T., to Affinity Biotech, Inc. Inhibiting aggregation in fluorocarbon emulsions. 5,073,383, Cl. 424-606.000.
Lyons, William J., Jr. Suspendable sleeping bag. 5,072,465, Cl. 5-121.000.
Lysaght, Michael J.: *See*—
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Lysiak, Phillip J. Device for holding bedclothes in a fixed position on a bed. 5,072,470, Cl. 5-496.000.
Lytle, William H.: *See*—
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M/A-Com, Inc.: *See*—
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Mabie, Norman H., to L.M. & L. Corporation. Belt connector with improved bite. 5,073,155, Cl. 474-256.000.
MacGregor, James W., to Detroit Diesel Corporation. Piston and bearing assemblies. 5,072,654, Cl. 92-157.000.
Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, to Hoechst Aktiengesellschaft. Process for enhancing the electrostatic chargeability of powder coatings of powders, and the

use thereof for surface-coating solid objects. 5,073,579, Cl. 524-255.000.

Mack, Hans-Dieter, to Rohm, Gunter H. Drill chuck with position indicator. 5,072,954, Cl. 279-60.000.

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Mackey, Paul W.: *See—*
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Maeda, Eiichi: *See—*
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Maeda, Hiroshi: *See—*
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Maeda, Takeshi; and Tsunoda, Yoshito, to Hitachi, Ltd. Information recording/reproducing method and apparatus. 5,073,880, Cl. 369-32.000.

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Maeno, Matagoro: *See—*
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Magainin Sciences Inc.: *See—*
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Magara, Takuji; Iwasaki, Takeshi; Suzuki, Toshio; and Yamamoto, Masahiro, to Mitsubishi Denki K.K. Wire electrode feeding device in wire cut electric discharge machine. 5,073,691, Cl. 219-69.120.

Magdassi, Shlomo: *See—*
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Magee, Vera C. Phosphorescent key pad. 5,073,843, Cl. 362-84.000.

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Magne, Francois; and Chelouche, Marc, to U.S. Philips Corp. Information transmission arrangement using frequency modulation. 5,073,903, Cl. 375-45.000.

Magneco/Metrel, Inc.: *See—*
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Mahant-Shetti, Shivaling S.: *See—*
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Mahoney, Patrick F.: *See—*
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Maliga, Pal: *See—*
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Mallinckrodt, Albert J. Integrated cellular communications system. 5,073,900, Cl. 375-1.000.

Malon, Jean-Pierre, to Aigle Azur Concept. System for the control of the progression of several railway trains in a network. 5,072,900, Cl. 246-5.000.

Mammino, Joseph: *See—*
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Marcin, Edward, to Laser Labs, Inc. Window-transmittance meter having entrance detector. 5,073,707, Cl. 250-223.00R.

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Marcus, Joseph. Vibrational liquid-wave stimulating therapy mask apparatus for facial health and beauty care. 5,072,724, Cl. 128-66.000.

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Marron, Joseph C., to Environmental Research Institute of Michigan. Bifocal ophthalmic lens constructed from birefringent material. 5,073,021, Cl. 351-168.000.

Marshall, Lucia G. I.; Patel, Kanaiyalal R.; and Roufa, Dikla G., to G. D. Searle & Co. Controlled release formulations of trophic factors in ganglioside-lipsome vehicle. 5,073,543, Cl. 514-21.000.

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Martin, Michael W.; Moor, John C.; and Bird, Terence J., to International Computers Limited. Data processing system with search processor which initiates searching in response to predetermined disk read and write commands. 5,073,854, Cl. 364-425.000.

Martin, Richard R.; Ogden, G. Richard; and Rodden, Paul M., to Callidus Technologies Inc. Low NO_x burner assemblies. 5,073,105, Cl. 431-116.000.

Martin, Roland: *See—*
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Martinez, Wilfred A.: *See—*
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Yamazaki, Tadashi, 5,073,304, Cl. 252-603.000.
Marullo, Gaetano C. Boat carrier. 5,072,959, Cl. 280-47.331.
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Maruyama, Masao; Kozakura, Nobuto; Nakakubo, Katsuya; and Okamoto, Nobuo, to Tsubakimoto Chain Co. Diaphragm seal type tensioner. 5,073,149, Cl. 474-104.000.
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Roccon, Roberto; and Schwager, Martin, 5,072,492, Cl. 19-159.00R.
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Taratuta, Victor G.; Thurston, George M.; and Benedek, George B., 5,072,731, Cl. 128-633.000.
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Masuda, Toshihiko: *See*—
Ueki, Masaaki; Yasuda, Nobuyuki; and Masuda, Toshihiko, 5,073,778, Cl. 341-131.000.
Masukawa, Hirohumi; and Hisamura, Makoto, to Hitachi, Ltd. Method and apparatus of measuring a subscriber line. 5,073,920, Cl. 379-30.000.
Maszara, Witold P.; and Caviglia, Anthony L., to Allied-Signal Inc. Method for making a self-aligned lateral bipolar SOI transistor. 5,073,506, Cl. 437-21.000.
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Roehl, Siegfried; and Mathuni, Josef, 5,073,515, Cl. 437-52.000.
Matner, Richard R.; Foltz, William E.; and Woodson, Lewis P., to Minnesota Mining and Manufacturing Company. Rapid method for determining efficacy of a sterilization cycle and rapid read-out biological indicator. 5,073,488, Cl. 435-31.000.
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Yamaguchi, Yasuyoshi; and Matsuda, Susumu, 5,073,800, Cl. 355-297.000.
Matsuda, Yasuo: *See*—
Yoshimura, Ichiro; Matsuda, Yasuo; and Chigusa, Yoshiki, 5,073,179, Cl. 65-2.000.
Matsuhashi, Tyoku; Usui, Mitsuko; Mitsuhashi, Masakazu; and Ando, Shunsaku, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Hyposensitization agent. 5,073,628, Cl. 530-379.000.
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Cook, John E.; and Matsumiya, James, 5,072,567, Cl. 52-716.000.
Matsumoto, Kazuaki; Omori, Toshimichi; Sanpei, Tetsuya; and Tagawa, Hisatoshi, to NKK Corporation. Method for manufacturing steel article having high magnetic permeability and low coercive force. 5,073,211, Cl. 148-120.000.
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Matsumoto, Kunihiko: *See*—
Ohashi, Kunio; and Matsumoto, Kunihiko, 5,073,832, Cl. 360-75.000.
Matsumoto, Kunihiro; Aoki, Masashi; Ohnaka, Shuji; Motonaga, Hideshi; and Nishino, Yukinobu, to Shibuya Kogyo Co., Ltd. Apparatus for inspecting the presence of foreign matters. 5,073,708, Cl. 250-223.00B.
Matsumoto, Masaharu: *See*—
Yoshida, Hiroko; Serikawa, Mitsuhiko; Kawamura, Akihisa; Matsumoto, Masaharu; and Sato, Katsuaki, 5,073,942, Cl. 381-61.000.
Matsumoto, Yasutami, to Nippon Seiko Co., Ltd. Grinding method and grinding machine with controlled grinding force. 5,072,550, Cl. 51-290.000.
Matsumura, Makoto: *See*—
Umemura, Toshikazu; Matsumura, Makoto; Izumida, Toshiaki; and Akahori, Kazuyuki, 5,073,313, Cl. 264-1.100.
Matsumura, Masami: *See*—
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.
Matsuno, Yuji: *See*—
Kikuchi, Toshiyuki; Fujii, Masaki; Abe, Mitsutoshi; and Matsuno, Yuji, 5,072,630, Cl. 74-858.000.
Matsuo, Shunji: *See*—
Haneda, Satoshi; Fukuchi, Masakazu; Matsuo, Shunji; and Morita, Shizuo, 5,073,801, Cl. 355-311.000.
Matsushima, Kenichi. Lock type swinging apparatus in a pair of swinging members and folding knife provided with said apparatus. 5,072,513, Cl. 30-161.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Akiyama, Ryo, 5,073,881, Cl. 369-32.000.
Hirota, Ken; Satomi, Mitsuo; and Kugimiya, Koichi, 5,073,214, Cl. 148-306.000.
Iuri, Tatsuro, 5,073,821, Cl. 358-133.000.
Kageyama, Satoshi; and Fukuhara, Suemei, 5,073,945, Cl. 381-89.000.
Muraji, Tsutomu; Takeuchi, Akihiro; and Ochi, Atsuo, 5,073,826, Cl. 358-335.000.
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 5,073,925, Cl. 380-3.000.
Ono, Taizo; Sakamoto, Hirotsugu; Katayama, Yoshihiro; and Saitoh, Toshi, 5,073,797, Cl. 355-215.000.
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.
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Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., 5,073,633, Cl. 540-545.000.
Matthews International Corporation: *See*—
Philpot, Ivan N.; and Bittick, Bruce G., 5,072,525, Cl. 33-618.000.
Matthews, Max M.; and Matthews, Scott E. Technique for displaying custom vehicular wheels. 5,072,536, Cl. 40-587.000.
Matthews, Scott E.: *See*—
Matthews, Max M.; and Matthews, Scott E., 5,072,536, Cl. 40-587.000.
Matyas, Stephen M.; Johnson, Donald B.; Le, An V.; Martin, William C.; Prymak, Rostislaw; Rohland, William S.; and Wilkins, John D., to International Business Machines Corporation. Method and apparatus for controlling the use of a public key, based on the level of import integrity for the key. 5,073,934, Cl. 380-30.000.
Mauch, Magnus; and Kehrberger, Achim L. Hydraulic drive with fluid cooling by-pass line. 5,072,584, Cl. 60-378.000.
May, Randall L. Adjustable tripod stand. 5,072,910, Cl. 248-412.000.
Mayer, Martin: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.
Mayfield, John T., III, to Meyer Company, The. Dispenser. 5,072,997, Cl. 312-35.000.
Mazda Motor Corporation: *See*—
Fujihira, Shinji; Yanagidani, Yuko; Tohda, Isao; and Kanbara, Shinji, 5,072,698, Cl. 123-52.0MB.
Hirasa, Yoshiaki, 5,073,944, Cl. 381-86.000.
Katayama, Kenji; and Yashiki, Seiji, 5,072,711, Cl. 123-486.000.
Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, 5,072,995, Cl. 303-100.000.
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Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, 5,072,966, Cl. 280-730.000.
Mazloomdoost, Manoochehr; and Foon, Wilfred L., to University of Pittsburgh of the Commonwealth System of Higher Education. Vaporizer for inhalation anesthetics during high-frequency jet ventilation and associated method. 5,072,726, Cl. 128-200.140.
Mazur, Joseph F.: *See*—
Blackburn, Brian K.; Gentry, Scott B.; and Mazur, Joseph F., 5,073,860, Cl. 364-424.050.
Mazzenga, Gerard C.; and Berner, Bret, to Ciba-Geigy Corporation. Transdermal administration of zwitterionic drugs. 5,073,539, Cl. 514-2.000.
McAdory, George D.: *See*—
Smith, R. Arnold, 5,073,555, Cl. 514-252.000.
McArdle, Ciaran B.; Clark, Michael G.; Beck, William R.; and Bowry, Carolyn, to General Electric Company, p.l.c., The. Method of and apparatus for making optical storage devices. 5,073,219, Cl. 156-242.000.
McBrayer, Patrick A.: *See*—
O'Leary, Robert K.; and McBrayer, Patrick A., 5,073,373, Cl. 424-422.000.
McCartney, Henry A., to Washington Mills Ceramics Corporation. Method and apparatus for producing compacted particulate articles. 5,073,323, Cl. 264-118.000.
McCarty, John A., to Schering Corporation. Fast dissolving buccal tablet. 5,073,374, Cl. 424-435.000.

McCarty, Michael R.: *See—*
Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., 5,073,091, Cl. 60-222.00R.

McCloud, Calvin E. Sectional rod bearing for fussball game structure. 5,072,880, Cl. 273-85.00D.

McCormack, William C. Body temperature responsive transport warming blanket. 5,073,688, Cl. 219-212.000.

McCown, Jack T.: *See—*
Liberati, Patricia; McCown, Jack T.; Aronson, Michael; and van de Pas, Johannes C., 5,073,285, Cl. 252-94.000.

McCoy, John W.; and Steenrod, Wayne, to Avon Products, Inc. Apparatus and method for cleaning tubular articles. 5,072,747, Cl. 134-48.000.

McDermott, Thomas C., Jr.: *See—*
Fagundes, Carlos A.; McDermott, Thomas C., Jr.; and Colby, David M., 5,073,263, Cl. 210-321.830.

McDonald, Alexander B.: *See—*
McIntyre, Robert G.; and McDonald, Alexander B., 5,072,896, Cl. 244-122.0AF.

McDonnell Douglas Corporation: *See—*
McIntyre, Robert G.; and McDonald, Alexander B., 5,072,896, Cl. 244-122.0AF.

McDougall, Lee A.: *See—*
Newlove, John C.; McDougall, Lee A.; Walker, John R.; and Stockwell, John R., 5,073,276, Cl. 252-8.551.

McDowell, W. Stuart. Electronic dictionary with vertical keyboard. 5,073,054, Cl. 400-486.000.

McGee, John K.: *See—*
Stearns, Kenneth W.; and McGee, John K., 5,072,928, Cl. 272-69.000.

McIntyre, Robert G.; and McDonald, Alexander B., to McDonnell Douglas Corporation. Powered canopy breakers. 5,072,896, Cl. 244-122.0AF.

McKinney, Larry J.: *See—*
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and Lefiles, James H., 5,073,191, Cl. 71-121.000.

McLane, John A.: *See—*
Wovkulich, Peter M.; Uskokovic, Milan R.; Goldstein, Ann; and McLane, John A., 5,073,568, Cl. 514-460.000.

McNeil-PPC, Inc.: *See—*
Babu, Suresh R.; Glinecke, Robert; Murtha, John L.; and Radebaugh, Galen W., 5,073,380, Cl. 424-472.000.

McWain, Richard J. Collapsible therapeutic weight system. 5,072,935, Cl. 272-119.000.

McWilliams, John P.: *See—*
Angevine, Philip J.; Johnson, Ivy D.; Marler, David O.; and McWilliams, John P., 5,073,655, Cl. 585-467.000.

Mead, Carver A.; and Allen, Timothy P., to Synaptics, Incorporated. Adaptable current mirror. 5,073,759, Cl. 330-288.000.

Mec-Mor S.r.l.: *See—*
Tenconi, Riccardo, 5,072,603, Cl. 66-222.000.

Meco Mining Equipment Limited: *See—*
Elliott-Moore, Peter, 5,073,067, Cl. 405-302.000.

Medical Concepts, Inc.: *See—*
Burke, Elliot M., 5,073,016, Cl. 359-727.000.

Medical Innovations Corporation: *See—*
Parks, Stephen K.; and Fishman, Udi, 5,073,166, Cl. 609-93.000.

Medical Laser Technologies Limited of Research Park: *See—*
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Medinorm Aktiengesellschaft medizintechnische Produkte: *See—*
Fell, Helmut, 5,073,172, Cl. 604-119.000.

Mee, John M. Biothermographic analysis of plants. 5,073,503, Cl. 436-147.000.

Meeks, William R., to Lawrence Paper Company, The. Die changeover apparatus for box blank cutting machine. 5,072,507, Cl. 29-568.000.

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Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 5,073,370, Cl. 424-195.100.

Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., to Meer Corporation. Low calorie, high fiber laxative. 5,073,370, Cl. 424-195.100.

Mehta, Arvind M.: *See—*
Turner, Deborah J.; Mehta, Arvind M.; Foley, Jeanne M.; and Doughty, Darrell G., 5,073,371, Cl. 424-401.000.
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Meier, Gary A.: *See—*
Roush, David M.; Davis, Steven G.; Lutomski, Kathryn A.; Meier, Gary A.; Phillips, Richard B.; and Burkart, Susan E., 5,073,564, Cl. 514-365.000.

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Meiners, Elmo R. High clearance vehicle frame construction. 5,072,805, Cl. 180-198.000.

Meives, Otis; Pritzl, Andrew B.; and Sauder, Charles H., to Pemco Inc. Method and apparatus for wrapping folio reams and the like. 5,072,572, Cl. 53-209.000.

Melec, Didier; You, Claudine; Lefere, Genevieve; and Peres, Claudine, to Societe Civile d'Inventeurs SPML. Mesh structure with high resistance to piercing and tearing. 5,073,441, Cl. 428-254.000.

Meloche, Steven A.: *See—*
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Meltzer, Leonard T.: *See—*
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Menegoli, Fabio, to Iscom S.r.l. Modular roofing panel. 5,072,563, Cl. 52-537.000.

Merck & Co., Inc.: *See—*
Morse, Lewis D., 5,073,205, Cl. 134-38.000.

Merck Sharp & Dohme Limited: *See—*
Baker, Raymond; Street, Leslie J.; and Saunders, John, 5,073,557, Cl. 514-254.000.

Meredith, Aloysius G.: *See—*
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Merlo, Vincenzo. Automatic intelligent magazine for electronic components. 5,073,078, Cl. 414-274.000.

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Meszaros, Steve P. Locking accessory. 5,072,976, Cl. 292-207.000.

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Derbyshire, Rodney L., 5,073,625, Cl. 530-333.000.

Methvin, David H.; and Un, Chong S., to Davin Computer Corporation. Parallel string processor and method for a minicomputer. 5,073,864, Cl. 364-715.110.

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Mayfield, John T., III, 5,072,997, Cl. 312-35.000.

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Meyers, Michael R.: *See—*
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Michaeli, Dov: *See—*
Shoshan, Shmuel; Michaeli, Dov; and Magdassi, Shlomo, 5,073,378, Cl. 424-548.000.

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Cerri, Gustavo; and Michaelson, Robert C., 5,073,663, Cl. 585-668.000.

Michaely, William J.; and Curtis, Jeff K., to ICI Americas Inc. Trisubstituted benzoic acid intermediates. 5,073,642, Cl. 560-18.000.

Micro-Precision Operations, Inc.: *See—*
Liechty, Deryll, 5,072,505, Cl. 29-450.000.

Micro Vesicular Systems, Inc.: *See—*
Wallach, Donald F. H., 5,073,202, Cl. 134-6.000.

Microelectronics and Computer Technology Corporation: *See—*
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Microlithics Corporation: *See—*
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Micron Technology, Inc.: *See—*
Doan, Trung; Tuttle, Mark E.; and Lowrey, Tyler A., 5,073,518, Cl. 437-180.000.
Lee, Ruojia R., 5,073,509, Cl. 437-34.000.

Midorikawa, Yoshio, to Tohyo Porimah Kabushikigaisha. Method for producing a gripping stick. 5,073,220, Cl. 156-244.110.

Miki, Masahiro: *See—*
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Miles Inc.: *See—*
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Miller, Alex E., to Union Oil Company of California. Aqueous solution for use in producing a solid animal feed supplement. 5,073,388, Cl. 426-74.000.

Miller, Benjamin D.: *See—*
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Miller, Calvin M.: *See—*
Clayton, Jane B.; El, Muhammad A.; Freeman, Lucius J.; and Miller, Calvin M., 5,073,004, Cl. 385-27.000.

Miller, Jack V.; and Miller, Ruth E. Toy foam plastic glider with flexible appendages. 5,073,137, Cl. 446-61.000.

Miller, Jeffrey T.; Modica, Frank S.; Cilluffo, Sandra L.; and Shum, Victor K., to Amoco Corporation. Method of regenerating a non-acidic zeolite catalyst. 5,073,529, Cl. 502-49.000.

Miller, Marion E. Soft body brace. 5,072,725, Cl. 128-78.000.

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Miller, Mary J.: *See*—
Sharp, Edward J.; Miller, Mary J.; Clark, William W., III; Wood, Gary L.; and Salamo, Gregory J., 5,073,705, Cl. 250-216.000.
Miller, Ruth E.: *See*—
Miller, Jack V.; and Miller, Ruth E., 5,073,137, Cl. 446-61.000.
Miller, Stephen J.: *See*—
Kline, Jules M.; Miller, Stephen J.; and Mulaskey, Bernard F., 5,073,250, Cl. 208-65.000.
Milletics, Bell and Clower: *See*—
Milletics, Michael L., 5,072,503, Cl. 29-426.500.
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Huguenin, G. Richard; Goldsmith, Paul F.; Deo, Naresh C.; and Walker, David K., 5,073,782, Cl. 342-179.000.
Millman, Norman A.; and Korban, Fouad F., to Trans-Atlantic Company. Paddle latch device. 5,072,977, Cl. 292-336.300.
Mills, Randell L. Magnetic susceptibility imaging (MSI). 5,073,858, Cl. 364-413.130.
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Milovich, Dimitrije; and Nelson, Ronald H. Composite backing structure for spray metal tooling. 5,073,589, Cl. 524-439.000.
Milsal, D'Miles E.: *See*—
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Mimori, Takashi; Maeno, Hiroshi; Endo, Yasuhiko; and Morishita, Tomohiro, to Asahi Glass Company, Ltd. Ceramic filter for a dust-containing gas and method for its production. 5,073,178, Cl. 55-523.000.
Minaskanian, Gevork: *See*—
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Minegishi, Masami: *See*—
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Blackwell, Elmer, 5,073,457, Cl. 428-484.000.
Hogenson, Raymond A., 5,072,517, Cl. 29-749.000.
Huang, Tzuli J., 5,073,404, Cl. 427-39.000.
Lee, John H., 5,072,730, Cl. 128-421.000.
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Iida, Tetsuya, 5,073,818, Cl. 358-80.000.
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Kitagawa, Tsuneo; and Araki, Kazuhiro, 5,073,794, Cl. 355-208.000.
Tada, Kaoru, 5,073,868, Cl. 395-112.000.
Ueda, Toshihiko, 5,073,015, Cl. 359-680.000.
Mion, Abramo: *See*—
Bonetti, Massimo; Manente, Giuseppe; and Mion, Abramo, 5,072,768, Cl. 160-199.000.
Miremadi, Bijan K.: *See*—
Morrison, S. Roy; and Miremadi, Bijan K., 5,072,886, Cl. 241-1.000.
Mirlieb, Bernd; Baumann, Kurt; and Killguss, Heinz, to Eastman Kodak Company. Cassette unloading and reloading apparatus with film detecting sensors. 5,073,916, Cl. 378-181.000.
Mishima, Kyoichi, to Mitsuboshi Belting Ltd. Vulcanizing flexible jacket used in power transmission belt manufacture. 5,073,098, Cl. 425-28.100.
Mishima, Tadahiko: *See*—
Kagechika, Hiroshi; Mishima, Tadahiko; and Kibe, Hiroshi, 5,073,403, Cl. 427-38.000.
Misselbrook, John; Hoff, Edwin F., Jr.; Bergman, Elliot; McKinney, Larry J.; and Lefiles, James H., to Griffin Corporation. Microeneapsulated agriculturally active material. 5,073,191, Cl. 71-121.000.
Mita Industrial Co., Ltd.: *See*—
Sugiyama, Tsukasa, 5,072,924, Cl. 271-110.000.
Sugiyama, Tsukasa, 5,073,802, Cl. 355-313.000.
Mitchell, James: *See*—
Mitchell, Winalee G.; Mitchell, James; Plotka, Michael; Van Streader, Gary; and Krassow, Thomas, 5,072,687, Cl. 118-37.000.
Mitchell, James G.: *See*—
Mitchell, Winalee G.; Mitchell, James; Plotka, Michael; Van Streader, Gary; and Krassow, Thomas, 5,072,687, Cl. 118-37.000.
Mitchell, Winalee G.; Mitchell, James; Plotka, Michael; Van Streader, Gary; and Krassow, Thomas, to Mitchell, James G.; and Mitchell, Winalee G. Absorbent product for personal use. 5,072,687, Cl. 118-37.000.
Mitsubishi Denki K.K.: *See*—
Magara, Takuji; Iwasaki, Takeshi; Suzuki, Toshio; and Yamamoto, Masahiro, 5,073,691, Cl. 219-69.120.
Wada, Shunichi; and Ohtagaki, Shigeki, 5,072,965, Cl. 280-707.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.
Ito, Osamu; and Hayashi, Shigeo, 5,073,885, Cl. 369-44.280.
Iwane, Yasushi, 5,073,901, Cl. 375-26.000.
Kajiwara, Toshiro; Kobayashi, Goroku; Fukuyama, Keiji; Sano, Ko; Yano, Yojiro; and Watanabe, Keiji, 5,073,743, Cl. 313-346.00R.
Kamon, Kazuya, 5,073,918, Cl. 378-205.000.
Omura, Etsuji, 5,073,895, Cl. 372-47.000.
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.
Suzuki, Akinobu; Sakazaki, Yuji; and Nakamura, Takeshi, 5,073,047, Cl. 385-93.000.
Takahashi, Mitsugu; Kobayashi, Yoshiaki; Mitsuhashi, Takao; and Yamagata, Shinji, 5,073,764, Cl. 335-16.000.
Ueda, Tetsuya, 5,073,817, Cl. 357-81.000.
Yamada, Michihiro; and Miyamoto, Hiroshi, 5,073,874, Cl. 365-226.000.
Yoshida, Susumu, 5,073,520, Cl. 437-184.000.
Mitsubishi Gas Chemical Co., Ltd.: *See*—
Umemura, Toshikazu; Matsumura, Makoto; Izumida, Toshiaki; and Akahori, Kazuyuki, 5,073,313, Cl. 264-1.100.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,073,865, Cl. 364-431.050.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Yanagimoto, Kazuhiro; and Hijikata, Akira, 5,072,985, Cl. 296-76.000.
Mitsubishi Kasei Corporation: *See*—
Bizen, Kunio; Kashino, Minoru; Suzuki, Tasuku; Hasegawa, Ryuichi; and Hayashi, Koji, 5,073,316, Cl. 264-22.000.
Suga, Yoshinori; Tanaka, Eiji; Kato, Satoshi; and Sato, Kaoru, 5,073,427, Cl. 428-64.000.
Mitsubishi Kasei Vinyl Company: *See*—
Bizen, Kunio; Kashino, Minoru; Suzuki, Tasuku; Hasegawa, Ryuichi; and Hayashi, Koji, 5,073,316, Cl. 264-22.000.
Mitsubishi Pencil Co., Ltd.: *See*—
Odajima, Hideo, 5,072,806, Cl. 181-170.000.
Mitsubishi Petrochemical Co., Ltd.: *See*—
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.
Mitsubishi Rayon Company, Limited: *See*—
Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, 5,073,606, Cl. 525-330.500.
Mitsuboshi Belting Ltd.: *See*—
Mishima, Kyoichi, 5,073,098, Cl. 425-28.100.
Takano, Hiroshi; Masuda, Takashi; Kanaoka, Tomizo; Akao, Hideyuki; Hioki, Katsuyuki; and Aragane, Toshiaki, 5,073,147, Cl. 474-28.000.
Mitsuhashi, Masakazu: *See*—
Matsuhashi, Tyoku; Usui, Mitsuko; Mitsuhashi, Masakazu; and Ando, Shunsaku, 5,073,628, Cl. 530-379.000.
Mitsuhashi, Takao: *See*—
Takahashi, Mitsugu; Kobayashi, Yoshiaki; Mitsuhashi, Takao; and Yamagata, Shinji, 5,073,764, Cl. 335-16.000.
Mitsui, Kenji: *See*—
Tabata, Katsuhiro; Hayase, Masahiro; Asami, Hajime; Asakura, Hiroyuki; and Mitsui, Kenji, 5,073,689, Cl. 219-10.491.
Mitsui Kinzoku Kogyo Kabushiki Kaisha: *See*—
Hamada, Yoshikazu; Ogino, Yozo; and Ashizawa, Katsuya, 5,072,975, Cl. 292-201.000.
Mitsui, Kiyoshi: *See*—
Abe, Hiroomi; Nishio, Taichi; Mitsui, Kiyoshi; Sogabe, Satoru; and Sanada, Takashi, 5,073,590, Cl. 524-449.000.
Mitsumori, Koji, to Sony Corporation. Objective lens driving apparatus including parallalogram structure. 5,073,883, Cl. 369-44.150.
Mitubishi Denki Kabushiki Kaisha: *See*—
Shimura, Teruyuki, 5,073,812, Cl. 357-34.000.
Miu, Ming-Tzer: *See*—
Staplin, Deborah K.; Shen, Jian-Kuo; and Miu, Ming-Tzer, 5,073,855, Cl. 395-375.000.
Miura, Ryuichi; Moriwaki, Ken; Takeyasu, Hiromitu; Washita, Hiroshi; and Miyazaki, Nobuyuki, to Asahi Glass Company, Ltd. Fluorine-containing copolymer, process for its production and curable composition. 5,073,613, Cl. 526-255.000.
Miura, Shizuharu: *See*—
Adachi, Rensuke; Miura, Shizuharu; and Sano, Hiroshi, 5,073,048, Cl. 385-115.000.
Miyabayashi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Sheet type storage battery and printed wiring board containing the same. 5,073,684, Cl. 174-260.000.
Miyama, Katsumi: *See*—
Ito, Masaya; and Miyama, Katsumi, 5,073,085, Cl. 415-216.100.
Miyamoto, Hiroshi: *See*—
Yamada, Michihiro; and Miyamoto, Hiroshi, 5,073,874, Cl. 365-226.000.
Miyao, Hidehiko; Shiotsuki, Masao; Kawamura, Shigeyoshi; and Komatsu, Fumiaki, to Kabushiki Kaisha Kobe Seiko Sho; and Doryokuro Kakunenryo. Method of evacuating radioactive waste treating container to vacuum. 5,073,305, Cl. 252-633.000.
Miyauchi, Yuji: *See*—
Washizu, Katsushi; and Miyauchi, Yuji, 5,072,902, Cl. 248-65.000.
Miyazaki, Nobuyuki: *See*—
Miura, Ryuichi; Moriwaki, Ken; Takeyasu, Hiromitu; Washita, Hiroshi; and Miyazaki, Nobuyuki, 5,073,613, Cl. 526-255.000.
Miyazawa, Tetsuo: *See*—
Imazu, Katsuhiro; Aizawa, Masanori; Miyazawa, Tetsuo; Satoh, Nobuyuki; and Kobayashi, Seishichi, 5,072,605, Cl. 72-46.000.

Mizuguchi, Kimio: *See*—
Takeuchi, Hiroshi; and Mizuguchi, Kimio, 5,072,816, Cl. 192-70.120.
Mizumura, Tetsuo: *See*—
Niimi, Hideaki; Isoe, Noboru; Wakai, Kunio; and Mizumura, Tetsuo, 5,073,449, Cl. 428-336.000.
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, to Idemitsu Petrochemical Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Polypropylene-based resin composition. 5,073,447, Cl. 428-327.000.
Mobil Oil Corp.: *See*—
Angevine, Philip J.; Johnson, Ivy D.; Marler, David O.; and McWilliams, John P., 5,073,655, Cl. 585-467.000.
Anzini, David J., 5,073,598, Cl. 525-193.000.
Beech, James H., Jr.; Owen, Hartley; Ramage, Michael P.; and Tabak, Samuel A., 5,073,351, Cl. 422-190.000.
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, 5,073,665, Cl. 585-722.000.
Farng, Liehpao O.; Horodysky, Andrew G.; and Murray, James G., 5,073,279, Cl. 252-47.000.
Herbst, Joseph A.; Markham, Catherine L.; Sapre, Ajit V.; and Teitman, Gerald J., 5,073,349, Cl. 422-144.000.
Owen, Hartley, 5,073,249, Cl. 208-48.00Q.
Vogt, Thomas C., Jr.; and Obluda, Gerard R., 5,072,990, Cl. 299-4.000.
Mochizuki, David A., to Nabors Industries, Inc. Method and apparatus for controlling the transfer of tubular members into a shelter. 5,072,656, Cl. 454-255.000.
Modica, Frank S.: *See*—
Miller, Jeffrey T.; Modica, Frank S.; Cilluffo, Sandra L.; and Shum, Victor K., 5,073,529, Cl. 502-49.000.
Mogi, Chikako: *See*—
Nakagawa, Chihiro; Fukuda, Hiroyuki; Sasaki, Hiroshi; Mogi, Chikako; and Yamada, Hidetoshi, 5,073,820, Cl. 358-133.000.
Mohamadi, Fariborz: *See*—
Lifer, Sherryl L.; Marshall, Winston S.; Mohamadi, Fariborz; Reel, Jon K.; Simon, Richard L.; Steinberg, Mitchell I.; and Whitesitt, Celia A., 5,073,566, Cl. 514-381.000.
Mohr, Larry D. Automated hydroponic growing system. 5,073,401, Cl. 426-658.000.
Moles, Donald R.: *See*—
Colbert, Charles; Jerison, Andrew D.; Berelman-Hall, David K.; Moles, Donald R.; and Potter, Nathan D., 5,073,950, Cl. 382-2.000.
Mollett, Christopher C.; and Sneddon, Gordon R., to Albright & Wilson Limited. Composition and method of deinking of recycled cellulosic material. 5,073,234, Cl. 162-5.000.
Molzahn, David C.: *See*—
Bowman, Robert G.; Molzahn, David C.; and Hartwell, George E., 5,073,635, Cl. 544-401.000.
Moncorge, Jean-Paul: *See*—
Dupraz, Jean-Pierre; and Moncorge, Jean-Paul, 5,073,747, Cl. 318-561.000.
Mondie, George R.: *See*—
Van Tyne, Richard G.; Neff, Marion W.; and Mondie, George R., 5,073,954, Cl. 382-18.000.
Monroe, Gary W. Anti-theft illuminated display device. 5,073,842, Cl. 362-83.200.
Monsanto Company: *See*—
Knorr, Raymond S., 5,073,453, Cl. 428-373.000.
Wun, Tze-Chein, 5,073,626, Cl. 530-350.000.
Montgomery, Jim R., to Beloit Corporation. Automatic conveyor transition sampler. 5,072,624, Cl. 73-863.910.
Monzyk, Bruce F.; and Woodard, Lloyd A. Device for measuring subsurface temperatures of liquid bodies, useful for determining optimum fishing locations. 5,072,540, Cl. 43-4.000.
Moor, John C.: *See*—
Martin, Michael W.; Moor, John C.; and Bird, Terence J., 5,073,854, Cl. 364-425.000.
Moore, Bruce H., to Teleflex Incorporated. Reverse stranded conduit. 5,072,759, Cl. 138-153.000.
Moore, Robert G., Jr., to Allied-Signal Inc. Acceleration override means for a fuel control. 5,072,578, Cl. 60-39.281.
Moos, Walter H.: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 5,073,561, Cl. 514-357.000.
Moracz, Donald J.; and Shipley, Roch J., to Compressor Components Textron Inc. Method of making hollow articles. 5,072,871, Cl. 228-193.000.
Moreau, Jacques-Pierre: *See*—
Coy, David H.; and Moreau, Jacques-Pierre, 5,073,624, Cl. 530-313.000.
Taylor, John E.; Bogden, Arthur E.; Moreau, Jacques-Pierre; and Coy, David H., 5,073,541, Cl. 514-9.000.
Moreland, David W.: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 5,073,561, Cl. 514-357.000.
Morello, Dominique: *See*—
Babinet, Charles; and Morello, Dominique, 5,073,490, Cl. 435-240.200.
Morgenthaler, Urs: *See*—
Muller, Peter; and Morgenthaler, Urs, 5,073,134, Cl. 440-50.000.
Mori, Kenji: *See*—
Kobayashi, Isao; Hamada, Yosuke; Mori, Kenji; and Hirai, Hiromu, 5,073,912, Cl. 378-34.000.
Mori, Takaaki: *See*—
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Uemura, Toshiya, 5,073,011, Cl. 359-265.000.
Morihiro, Shigeyasu: *See*—
Irie, Yoshio; Morihiro, Shigeyasu; Fujiwara, Teruaki; Sasabe, Masazumi; and Iwasaki, Kaoru, 5,073,612, Cl. 526-240.000.
Morimoto, Tadashi: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.
Morishita, Tomohiro: *See*—
Mimori, Takashi; Maeno, Hiroshi; Endo, Yasuhiko; and Morishita, Tomohiro, 5,073,178, Cl. 55-523.000.
Morita, Hikaru, to Nippon Telegraph and Telephone Corporation. Modular multiplication method and the system for processing both. 5,073,870, Cl. 364-746.000.
Morita, Shigeru; Yamabe, Kikuo; and Kakumu, Masakazu, to Kabushiki Kaisha Toshiba. Semiconductor device having buried element isolation region. 5,073,813, Cl. 357-49.000.
Morita, Shizuo: *See*—
Haneda, Satoshi; Fukuchi, Masakazu; Matsuo, Shunji; and Morita, Shizuo, 5,073,801, Cl. 355-311.000.
Morita, Yutaka: *See*—
Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, 5,073,375, Cl. 424-449.000.
Moriwaki, Ken: *See*—
Miura, Ryuichi; Moriwaki, Ken; Takeyasu, Hiromitu; Washita, Hiroshi; and Miyazaki, Nobuyuki, 5,073,613, Cl. 526-255.000.
Morozumi, Shinji: *See*—
Sonehara, Tomio; Aruga, Shuji; and Morozumi, Shinji, 5,073,013, Cl. 359-63.000.
Morrill, Wayne J. Electric motor lubrication. 5,072,510, Cl. 29-898.100.
Morris, Delores R.: *See*—
Antonacci, Paul N.; Eaton, Geraldine M.; Morris, Delores R.; and Tapp, William T., 5,073,436, Cl. 428-219.000.
Morris, Edward: *See*—
Lathrop, Stephen C.; Woodruff, Keith; and Morris, Edward, 5,073,057, Cl. 401-206.000.
Morris, George Q., to Power-One, Inc. Resonant DC to DC converter switching at zero current. 5,073,849, Cl. 363-21.000.
Morris, John A.: *See*—
Gorman, John Eugene; and Morris, John A., 5,073,600, Cl. 525-264.000.
Morrison, Robert D., to Hewlett-Packard Company. Method and apparatus for marking emulation analysis states. 5,073,968, Cl. 395-500.000.
Morrison, S. Roy; and Miremadi, Bijan K., to Simon Fraser University. Method of preparing a new ultra-fine particle transition alumina. 5,072,886, Cl. 241-1.000.
Morse, Lewis D., to Merck & Co., Inc. Method for detackification of paint stray operation wastes. 5,073,205, Cl. 134-38.000.
Morton International, Inc.: *See*—
Anderson, Paul H., 5,073,577, Cl. 524-609.000.
Brook, Richard L., 5,073,594, Cl. 525-65.000.
Moslehi, Mehrdad M., to Texas Instruments Incorporated. Selective epitaxial growth process flow for semiconductor technologies. 5,073,516, Cl. 437-89.000.
Motonaga, Hideshi: *See*—
Matsumoto, Kunihiro; Aoki, Masashi; Ohnaka, Shuji; Motonaga, Hideshi; and Nishino, Yukinobu, 5,073,708, Cl. 250-223.00B.
Motor Panels (Coventry) Ltd.: *See*—
Bromley, Patrick J.; and Luxton, Grenville G. H., 5,072,597, Cl. 62-209.000.
Motorola, Inc.: *See*—
Derfiny, Dennis, 5,073,000, Cl. 385-14.000.
Fliegel, Frederick M.; Cho, Frederick Y.; and Hickernell, Fred S., 5,073,807, Cl. 357-24.000.
Grube, Gary W., 5,073,927, Cl. 379-53.000.
Holmes, Thomas F.; Johnson, Rick; and Lenhart, Brian P., Jr., 5,073,767, Cl. 340-311.100.
Keller, Charles T.; and Wu, Schyi-Yi, 5,073,507, Cl. 437-22.000.
Kotzin, Michael D.; and Wilson, Alan L., 5,073,909, Cl. 377-72.000.
Liu, Jay J.; Scharr, Thomas A.; and Lytle, William H., 5,072,873, Cl. 228-264.000.
Pace, Wilson D., 5,073,850, Cl. 363-89.000.
Pfizenmayer, Henry L., 5,073,983, Cl. 359-187.000.
Schaeffer, Dennis R., 5,073,971, Cl. 455-33.000.
Mott, Philip J.: *See*—
Ivey, John S.; Bateman, Paul M.; Clauss, Julius A.; Cole, Edward H., Jr.; and Mott, Philip J., 5,073,154, Cl. 474-213.000.
Motus Incorporated: *See*—
Gudgel, Robert C.; and Baker, William, 5,072,973, Cl. 292-55.000.
Mountain, Frank: *See*—
Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 5,073,370, Cl. 424-195.100.
Mouri, Akihiro; Katayama, Masato; Fukui, Tetsuro; Isaka, Kazuo; Kikuchi, Shoji; and Koumura, Noboru, to Canon Kabushiki Kaisha. Image forming device. 5,073,791, Cl. 355-27.000.
MPR Teltech Ltd.: *See*—
Neufeld, Richard D., 5,073,755, Cl. 324-632.000.

MRM Security Systems, Inc.: *See*—
Mainiero, John W., 5,072,980, Cl. 294-15.000.

MTU Motoren- und Turbinen-Union Munchen GmbH: *See*—
Smarsly, Wilfried; and Track, Wolfgang, 5,073,459, Cl. 428-550.000.

Mukai, Tetsuya: *See*—
Matsumoto, Kazutoshi; Hyuga, Takehiro; and Mukai, Tetsuya, 5,073,528, Cl. 501-134.000.

Mulaskey, Bernard F.: *See*—
Kline, Jules M.; Miller, Stephen J.; and Mulaskey, Bernard F., 5,073,250, Cl. 208-65.000.

Mulhaupt, Rolf; and Rufenacht, Werner, to Ciba-Geigy Corporation. Composition of butadiene/polar comonomer copolymer, aromatic reactive end group-containing prepolymer and epoxy resin. 5,073,601, Cl. 525-109.000.

Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., to AMP Incorporated. Coupling bushing for various types of optical fiber connectors. 5,073,042, Cl. 385-69.000.

Muller, Anton; and Witzel, Gunter, to Eisen-und Drahtwerk Erlau Aktiengesellschaft. Stud link for a tire chain having recesses on sides of the link body. 5,072,763, Cl. 152-243.000.

Muller, Hartwig: *See*—
Frobel, Klaus; Bischoff, Erwin; Muller, Hartwig; Salcher, Olga; De Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 5,073,369, Cl. 424-121.000.

Muller, Klaus: *See*—
Wirth, Hermann O.; and Muller, Klaus, 5,073,277, Cl. 252-32.70R.

Muller, Peter; and Morgenthaler, Urs. Boat drive with adjustable pitch propeller. 5,073,134, Cl. 440-50.000.

Mullis, Jimmy W.: *See*—
Waterman, Timothy G.; Mullis, Jimmy W.; and Staehlin, John H., 5,073,761, Cl. 333-24.00C.

Multifastener Corporation: *See*—
Scott, Raymond E., 5,072,518, Cl. 29-798.000.

Mumpower, Ronald M. Means and methods for creating multiple images on a single film frame. 5,073,789, Cl. 354-122.000.

Munkeso, Morten, to Dansk Industri Syndikat A/S. Press with slidingly supported press chamber parts for pressing of sections. 5,072,776, Cl. 164-207.000.

Muraji, Tsutomu; Takeuchi, Akihiro; and Ochi, Atsuo, to Matsushita Electric Industrial Co., Ltd. Video signal transmission apparatus for frames with an odd number of lines. 5,073,826, Cl. 358-335.000.

Murakami, Masatsugi: *See*—
Satou, Junya; Murakami, Masatsugi; and Sasaki, Kikuji, 5,073,452, Cl. 428-349.000.

Murashige, Kazuhiro: *See*—
Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, 5,072,966, Cl. 280-730.000.

Murata, Kousaku: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Murata Mfg. Co.: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.

Murata Mfg. Co., Ltd.: *See*—
Kaneko, Toshimi; and Maeda, Eiichi, 5,072,508, Cl. 29-605.000.
Kawahata, Kazunari, 5,073,977, Cl. 455-330.000.

Murata, Yoshihiro: *See*—
Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, 5,073,926, Cl. 379-53.000.

Murata, Yoshiyuki, to Casio Computer Co., Ltd. Stringed musical instrument and manufacturing method of same. 5,072,643, Cl. 84-293.000.

Murayama, Yuuichirou: *See*—
Hashimoto, Hiroshi; Ushimaru, Akira; and Murayama, Yuuichirou, 5,073,439, Cl. 428-328.000.

Muroi, Kishiro; and Koura, Soushichi, to Ohi Seisakusho Co., Ltd. Automotive door with door pocket and tiltable armrest. 5,072,983, Cl. 296-37.130.

Murphy, John H.; and Jeeves, Terry A., to Westinghouse Electric Corp. Digital neural network processing elements. 5,073,867, Cl. 395-27.000.

Murray, Brendan D.: *See*—
Hertzenberg, Elliot P.; Murray, Brendan D.; Pasquale, Gary M.; and Winquist, Bruce H. C., 5,073,668, Cl. 585-739.000.

Murray, James G.: *See*—
Farng, Liehpao O.; Horodysky, Andrew G.; and Murray, James G., 5,073,279, Cl. 252-47.000.

Murray, Robert J.: *See*—
Collier, Christopher J.; and Murray, Robert J., 5,073,899, Cl. 375-1.000.

Murtha, John L.: *See*—
Babu, Suresh R.; Glinecke, Robert; Murtha, John L.; and Radebaugh, Galen W., 5,073,380, Cl. 424-472.000.

Murti, Dasarao K.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.

Musser, Deborah L.: *See*—
Dees, Martin, Jr.; Felter, Richard E.; and Musser, Deborah L., 5,073,425, Cl. 428-48.000.

Musumeci, Salvatore; and Ronsisvalle, Cesare, to SGS-Thomson Microelectronics S.r.L. Method for manufacturing a conductivity modulation MOS semiconductor power device (HIMOS). 5,073,511, Cl. 437-40.000.

Myco, Inc.: *See*—
Arnone, A. Jeanne, 5,072,839, Cl. 211-187.000.

N. Jonas & Co., Inc.: *See*—
Antelman, Marvin S., 5,073,382, Cl. 424-604.000.

Nabors Industries, Inc.: *See*—
Mochizuki, David A., 5,072,656, Cl. 454-255.000.

Naganawa, Tsutomu: *See*—
Ona, Isao; and Naganawa, Tsutomu, 5,073,608, Cl. 525-477.000.

Nagano, Masashi, to Shimano Industrial Co., Ltd. Multi-speed sprocket assembly for bicycle. 5,073,151, Cl. 474-160.000.

Nagase, Ryo: *See*—
DiMarco, Brain A.; Kawahara, Akira; and Nagase, Ryo, 5,073,043, Cl. 385-81.000.

Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for the protection of signal copy. 5,073,925, Cl. 380-3.000.

Nagatomo, Hideaki: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.

Nagayama, Hirotsugu: *See*—
Goda, Takuji; Nagayama, Hirotsugu; and Kawahara, Hideo, 5,073,408, Cl. 427-169.000.

Nagel, Marc F.: *See*—
Conaway, Lawrence S.; Nagel, Marc F.; and Pera, John D., 5,073,638, Cl. 548-169.000.

Nagorny, Vladimir D.: *See*—
Gorbunov, Valery F.; Eller, ALexandr F.; Tkachenko, ALexandr Y.; Axenov, Vladimir V.; and Nagorny, Vladimir D., 5,072,992, Cl. 299-33.000.

Nailite International: *See*—
Crick, Dallas M.; Perkins, James G.; and Hudson, Douglas F., Jr., 5,072,562, Cl. 52-533.000.

Nair, Madhavan G. Two non-polyglutamatable antifolates. 5,073,554, Cl. 514-249.000.

Naito, Yasuyuki: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.

Naka Corporation: *See*—
Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.

Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, to Naka Corporation. Device for fixing floor panels. 5,072,557, Cl. 52-126.600.

Nakagawa, Chihiro; Fukuda, Hiroyuki; Sasaki, Hiroshi; Mogi, Chikako; and Yamada, Hidetoshi, to Olympus Optical Co., Ltd. Image data coding apparatus and coding method. 5,073,820, Cl. 358-133.000.

Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, to Hitachi, Ltd. Continuous hot-dip plating apparatus. 5,072,689, Cl. 118-419.000.

Nakagawa, Zenbee: *See*—
Igari, Akihide; and Nakagawa, Zenbee, 5,073,302, Cl. 252-518.000.

Nakahara, Akihiro; Yamada, Mikio; Ebisuno, Tadahiro; Sasaki, Takashi; and Oka, Kengo, to Sumitomo Rubber Industries, Ltd. Three-piece solid golf ball. 5,072,944, Cl. 273-220.000.

Nakahara, Takeshi: *See*—
Furusawa, Sadayoshi; Hasegawa, Toyofumi; Nakahara, Takeshi; and Kato, Takehiko, 5,073,338, Cl. 420-109.000.

Nakai, Hiroto: *See*—
Kato, Hideo; Kikuchi, Shinichi; Nakai, Hiroto; and Iwahashi, Hiroshi, 5,073,726, Cl. 307-443.000.

Nakai, Yoshiyuki; Maruta, Kazuo; Nakajima, Tatsushi; and Kawanaka, Seido, to Sharp Kabushiki Kaisha. Image processing method using improved Bresenham algorithm in creating an outline of a figure to be painted and apparatus adopting the method. 5,073,960, Cl. 382-22.000.

Nakajima, Hirotaka: *See*—
Okazaki, Takahisa; Okumoto, Shinichi; and Nakajima, Hirotaka, 5,072,735, Cl. 128-660.070.

Nakajima, Ken: *See*—
Saito, Takayuki; Nakajima, Ken; Iwase, Yoki; Ikeda, Yukio; and Shima, Hiroyuki, 5,073,268, Cl. 210-638.000.

Nakajima, Tatsushi: *See*—
Nakai, Yoshiyuki; Maruta, Kazuo; Nakajima, Tatsushi; and Kawanaka, Seido, 5,073,960, Cl. 382-22.000.

Nakajima, Toshifumi, to Canon Kabushiki Kaisha. Image communication apparatus. 5,073,827, Cl. 358-437.000.

Nakakawaji, Takayuki: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.

Nakakubo, Katsuya: *See*—
Maruyama, Masao; Kozakura, Nobuto; Nakakubo, Katsuya; and Okamoto, Nobuo, 5,073,149, Cl. 474-104.000.

Nakamichi Corporation: *See*—
Nakamichi, Niro, 5,072,787, Cl. 165-80.300.

Nakamichi, Niro, to Nakamichi Corporation. Finned heat sink. 5,072,787, Cl. 165-80.300.

Nakamori, Kazunobu: *See*—
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.

Nakamura, Kenichi: *See*—
Masuda, Masami; and Nakamura, Kenichi, 5,073,872, Cl. 365-189.050.

Nakamura, Kenji: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.

Nakamura, Masahiko, to Hosiden Corporation. Electrical Connector. 5,073,130, Cl. 439-607.000.

Nakamura, Masato: *See*—
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.

Nakamura, Minoru: *See*—
Kasai, Minoru; and Nakamura, Minoru, 5,073,142, Cl. 452-51.000.

Nakamura, Norio: *See*—
Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.

Nakamura, Shigekazu: *See*—
Takagi, Masaaki; Nakamura, Shigekazu; and Omura, Atsushi, 5,073,710, Cl. 250-231.140.

Nakamura, Shigeki; and Takahashi, Yasufumi, to Hitachi, Ltd. Digital signal processing type demodulation method and demodulation circuit. 5,073,904, Cl. 375-94.000.

Nakamura, Takeshi: *See*—
Suzuki, Akinobu; Sakazaki, Yuji; and Nakamura, Takeshi, 5,073,047, Cl. 385-93.000.

Nakamura, Yuichi: *See*—
Ando, Hideo; and Nakamura, Yuichi, 5,073,879, Cl. 369-13.000.

Nakano, Toshihiro; and Tauchi, Hitoshi, to Aisin Seiki Kabushiki Kaisha. Reservoir cap. 5,072,844, Cl. 215-230.000.

Nakao, Yasushi; Fukuda, Mitsuhiro; and Yabuta, Motoshi, to Kansai Paint Co., Ltd. Thermosetting resin composition. 5,073,602, Cl. 525-155.000.

Nakashima, Akifumi, to Brother Kogyo Kabushiki Kaisha. Pattern stitch sewing machine having image projection means. 5,072,680, Cl. 112-445.000.

Nakashima, Hiroshi: *See*—
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.

Nakayama, Fujio: *See*—
Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, 5,072,813, Cl. 188-322.150.

Nalco Chemical Company: *See*—
Stephenson, William K.; and Kaplan, Morris, 5,073,248, Cl. 208-22.000.

Nalette, Timothy A.; and Steele, John W., to United Technologies Corporation. Eluant storage and preparation apparatus and method for using the same in a zero gravity environment. 5,073,505, Cl. 436-178.000.

Namba, Takaoki; and Kamada, Teruo, to Honda Giken Kogyo Kabushiki Kaisha. Method of producing pattern for molding castings. 5,072,782, Cl. 164-45.000.

Narabe, Yukio: *See*—
Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, 5,073,659, Cl. 585-600.000.

Narita, Isamu: *See*—
Obata, Tokio; Fujii, Katsutoshi; Narita, Isamu; and Shikita, Shoji, 5,073,558, Cl. 514-259.000.

Natarajan, Govindarajan: *See*—
Farooq, Shaji; Natarajan, Govindarajan; Reddy, Srinivasa S. N.; Shelleman, Richard A.; Stoffel, Nancy C.; and Vallabhaneni, Rao V., 5,073,180, Cl. 65-18.400.

Natco: *See*—
Ball, Will D., IV, 5,073,266, Cl. 210-519.000.

National Presto Industries, Inc.: *See*—
Tienor, Lawrence J.; and Shope, John L., Jr., 5,072,664, Cl. 99-353.000.

National Research Development Corporation: *See*—
Majumdar, Amalendu J.; and Singh, Bahadur, 5,073,197, Cl. 106-692.000.

Naumann, Rolf, to Karl Mayer Textilmaschinenfabrik GmbH. Weft thread transporter. 5,072,602, Cl. 66-84.00A.

Nawrocki, Ryszard, to Ford Motor Company. Apparatus and method for gauging the amount of fuel in a vehicle fuel tank subject to tilt. 5,072,615, Cl. 73-291.000.

Naysmith, Peter M., Jr.: *See*—
Ruff, Gary F.; Voss, Karl D.; Naysmith, Peter M., Jr.; and De Rupa, James L., 5,072,773, Cl. 164-127.000.

NCR Corporation: *See*—
Ames, Stephen J., 5,073,838, Cl. 361-103.000.
Daley, Phillip B.; and Puckett, Richard D., 5,073,052, Cl. 400-208.000.
Numata, Kunjo; Niikura, Noriyasu; and Kobayashi, Takemi, 5,073,049, Cl. 400-54.000.
Schuhmacher, Chris A., 5,073,702, Cl. 235-467.000.

NDC Co., Ltd.: *See*—
Kikuchi, Hiroyoshi; Kosuge, Hiroto; and Suzuki, Syunsuke, 5,073,693, Cl. 219-93.000.

NEC Corporation: *See*—
Hashiguchi, Osamu; Tayama, Yukiharu; and Yamamura, Shigeharu, 5,073,125, Cl. 439-310.000.
Otani, Susumu; and Endo, Syouji, 5,073,906, Cl. 375-116.000.
Sasaki, Yoshinori, 5,073,882, Cl. 369-44.150.
Yoshino, Akira, 5,073,512, Cl. 437-41.000.

Neer, Lawrence A.: *See*—
Wonder, Terry M.; Sorenson, Joseph T.; Hendry, Garlyn W.; and Neer, Lawrence A., 5,072,738, Cl. 128-888.000.

Neff, Marion W.: *See*—
Van Tyne, Richard G.; Neff, Marion W.; and Mondie, George R., 5,073,954, Cl. 382-18.000.

Nelson, Gregory H., to Rogers Corporation. Method of manufacturing an interconnect device having coplanar contact bumps. 5,072,520, Cl. 29-852.000.

Nelson, Ronald H.: *See*—
Milovich, Dimitrije; and Nelson, Ronald H., 5,073,589, Cl. 524-439.000.

Nergeco (SA): *See*—
Kraeutler, Bernard, 5,072,767, Cl. 160-84.100.

Nespor, Tony: *See*—
Dandy, Walter, III; and Nespor, Tony, 5,072,970, Cl. 280-811.000.

Neubert, Gerhard, to BASF Aktiengesellschaft. Aqueous coating materials based on secondary dispersions of carboxyl-containing copolymers of acrylates or methacrylates. 5,073,585, Cl. 524-139.000.

Neufeld, Richard D., to MPR Teltech Ltd. Method and apparatus for measuring the electrical properties of dielectric film in the gigahertz range. 5,073,755, Cl. 324-632.000.

Neumann, Horst: *See*—
Eschwey, Manfred; van Bonn, Rolf; and Neumann, Horst, 5,073,231, Cl. 156-646.000.

Newell Operating Company: *See*—
Graves, Delbert B.; and Anderson, Roger L., 5,072,494, Cl. 29-24.500.

Newkirk, Marc S.; and Zwicker, Harry R., to Lanxide Technology Company, LP. Self-supporting ceramic materials. 5,073,527, Cl. 501-127.000.

Newlove, John C.; McDougall, Lee A.; Walker, John R.; and Stockwell, John R., to Exxon Research and Engineering Co. Polymer article of manufacture. 5,073,276, Cl. 252-8.551.

Newmaster, Jeffrey T.: *See*—
Brininstool, Michael R.; Newmaster, Jeffrey T.; and Garrett, Steven L., 5,073,711, Cl. 250-231.180.

Newton, Charles M.: *See*—
Postlewait, Lester B.; and Newton, Charles M., 5,073,758, Cl. 324-713.000.

Newton, Maurice M.; and Spector, George. Automatic fish feeder. 5,072,695, Cl. 119-51.040.

NGK Insulators, Ltd.: *See*—
Horikawa, Osamu; Harada, Takashi; and Ikeshima, Koichi, 5,073,432, Cl. 428-116.000.

NGK Spark Plug Co., Ltd.: *See*—
Ito, Masaya; and Miyama, Katsumi, 5,073,085, Cl. 415-216.100.
Suzuki, Takahiro; and Aoki, Noboru, 5,073,741, Cl. 313-138.000.

Nguyen, Dong D., to Union Camp Corporation. Method and apparatus for detecting amplitude and frequency of web flutter using infrared optical sensor. 5,073,714, Cl. 250-341.000.

Nguyen, Tan H., to Guyomarc'h Nutrition Animale. Method for increasing the productivity of sows. 5,073,367, Cl. 424-93.000.

NHK Spring Co., Ltd.: *See*—
Ojima, Juji, 5,073,158, Cl. 474-138.000.

Nichol-Landry, Deborah J.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.

Nicholas, David M.: *See*—
Guro, David E.; Kumar, Ravi; Nicholas, David M.; and Roth, Gary S., 5,073,356, Cl. 423-415.00A.

Nickle, Steven L. Kite accessory release device with dissolvable member. 5,072,899, Cl. 244-155.00R.

Nickson Industries, Inc.: *See*—
Florian, Roy S., 5,073,353, Cl. 422-310.000.

Niederstaetter, Walter: *See*—
Wojtech, Bernhard; Niederstaetter, Walter; and Thamm, Horst-Dieter, 5,073,622, Cl. 528-486.000.

Nielsen, Kaj, to Deltagraph A/S. Process for obtaining a package containing mutually reactive particulate materials. 5,072,830, Cl. 206-219.000.

Nielsen, Niels M.: *See*—
Bundgaard, Hans; and Nielsen, Niels M., 5,073,641, Cl. 560-56.000.

Niemi, Randolph G.; and Strong, Michael R., to Dow Corning Corporation. Method for transporting a cured organic or organosiloxane gel. 5,072,854, Cl. 222-1.000.

Nietering, Kenneth E., to Ford Motor Company. Laminated glazing unit. 5,073,450, Cl. 428-336.000.

Nieto, Daniel M.: *See*—
Rodriguez Urroz, Augusto C.; and Nieto, Daniel M., 5,072,682, Cl. 114-91.000.

Nihon Kohden Corporation: *See*—
Ogawa, Keikitsu; Takeda Sunoa; Hyogo, Mitsushi; and Shindo, yoshiaki, 5,072,736, Cl. 128-680.000.

Niikura, Noriyasu: *See*—
Numata, Kunjo; Niikura, Noriyasu; and Kobayashi, Takemi, 5,073,049, Cl. 400-54.000.

Niimi, Hideaki; Isoe, Noboru; Wakai, Kunio; and Mizumura, Tetsuo, to Hitachi Maxell Ltd. Magnetic recording medium and method for producing the same. 5,073,449, Cl. 428-336.000.

Nippin Sheet Glass Co., Ltd.: *See*—
Goda, Takuji; Nagayama, Hirotsugu; and Kawahara, Hideo, 5,073,408, Cl. 427-169.000.

Nippon Ferrofluidics Corporation: *See*—
Yamamura, Akira, 5,073,737, Cl. 310-90.500.

Nippon Paint Co., Ltd.: *See*—
Kusuda, Hidefumi; Konishi, Katsuji; and Ueda, Koichi, 5,073,477, Cl. 430-287.000.

Nippon Petrochemicals Company, Limited: *See*—
Yano, Katsumi; and Kambe, Shigemitsu, 5,073,420, Cl. 428-35.700.

Nippon Seiko Co., Ltd.: *See*—
Matsumoto, Yasutami, 5,072,550, Cl. 51-290.000.

Nippon Seiko Kabushiki Kaisha: *See*—
Kagita, Kazuhiro, 5,072,651, Cl. 92-75.000.
Kurachi, Nobuhide, 5,073,159, Cl. 475-216.000.

Nippon Shokubai Kagaku Kogyo, Co., Ltd.: *See*—
Irie, Yoshio; Morihiro, Shigeyasu; Fujiwara, Teruaki; Sasabe, Masazumi; and Iwasaki, Kaoru, 5,073,612, Cl. 526-240.000.

Nippon Steel Corporation: *See*—
Uematsu, Masahiro; Hiratsuka, Ryuichi; and Kato, Kazuro, 5,073,783, Cl. 342-359.000.

Nippon Telegraph and Telephone Corporation: *See*—
—Morita, Hikaru, 5,073,870, Cl. 364-746.000.

Nisca Corporation: *See*—
Iijima, Tamotsu; and Sano, Kazuhide, 5,073,739, Cl. 310-323.000.

Nishida, Kouji: *See*—
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.

Nishida, Kozi: *See*—
Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, 5,073,606, Cl. 525-330.500.

Nishida, Toshio: *See*—
Toyonaga, Hajime; Nishida, Toshio; Takeishi, Yasuo; and Shiomi, Masao, 5,073,106, Cl. 431-285.000.

Nishihata, Masahiro: *See*—
Nomura, Norimasa; and Nishihata, Masahiro, 5,073,921, Cl. 379-100.000.

Nishijima, Hiroaki: *See*—
Hirabayashi, Kazuo; Kondoh, Tadami; Nishijima, Hiroaki; Inoue, Shinichi; Adachi, Kouji; Igarashi, Fumiho; and Wakai, Toshio, 5,073,673, Cl. 585-415.000.

Nishimori, Kadotaro: *See*—
Kato, Tomokazu; Maruta, Syuzi; Ito, Masazumi; Nishimori, Kadotaro; and Higashio, Kimihiko, 5,073,803, Cl. 355-324.000.

Nishimura, Akira, to Fujitsu Limited. Hot standby transmitter switching system using upper and lower sideband waves. 5,073,974, Cl. 455-103.000.

Nishimura, Takashi: *See*—
Futamoto, Masaaki; Honda, Yukio; Asada, Selichi; Nishimura, Takashi; and Yoshida, Kazuetsu, 5,073,460, Cl. 428-694.000.

Nishino, Yukinobu: *See*—
Matsumoto, Kunihiro; Aoki, Masashi; Ohnaka, Shuji; Motonaga, Hideshi; and Nishino, Yukinobu, 5,073,708, Cl. 250-223.00B.

Nishio, Hiroaki; Watanabe, Keiji; and Sato, Michitaka, to NKK Corporation. Method of molding polysilazane. 5,073,330, Cl. 264-535.000.

Nishio, Taichi: *See*—
Abe, Hiroomi; Nishio, Taichi; Mitsui, Kiyoshi; Sogabe, Satoru; and Sanada, Takashi, 5,073,590, Cl. 524-449.000.
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

Nishio, Takeyoshi: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.

Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, to Mazda Motor Corporation. Energy absorbing structure for vehicle body side portion. 5,072,966, Cl. 280-730.000.

Nishiyama, Satoshi: *See*—
Kojima, Yasuhiro; Maeda, Hiroshi; Nishiyama, Satoshi; and Perry, David A., 5,073,567, Cl. 514-450.000.

Nishizawa, Hiroaki: *See*—
Arima, Masatoshi; Nishizawa, Hiroaki; Takeuchi, Keiji; Deura, Hiroshi; and Ishida, Keiichiro, 5,073,545, Cl. 514-27.000.

Nissan Motor Company, Ltd.: *See*—
Oshidari, Toshikazu, 5,073,160, Cl. 475-281.000.
Suzuki, Yutaka, 5,073,859, Cl. 364-424.100.

Nisson Motor Company, Ltd.: *See*—
Urushihara, Tomonori; Yokoyama, Junichi; and Itoh, Teruyuki, 5,072,583, Cl. 60-313.000.

Nithart, Henri: *See*—
Bencharab, Christian; Bonnet, Patrick; and Nithart, Henri, 5,073,679, Cl. 174-15.500.

NKK Corporation: *See*—
Kagechika, Hiroshi; Mishima, Tadahiko; and Kibe, Hiroshi, 5,073,403, Cl. 427-38.000.
Matsumoto, Kazuaki; Omori, Toshimichi; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 5,073,211, Cl. 148-120.000.
Nishio, Hiroaki; Watanabe, Keiji; and Sato, Michitaka, 5,073,330, Cl. 264-535.000.

Noack, William L.: *See*—
Valentine, A. H. Llynn; and Noack, William L., 5,072,832, Cl. 206-570.000.

Nobumoto, Kazutoshi: *See*—
Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, 5,072,995, Cl. 303-100.000.

Nogami, Kazutaka, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 5,073,873, Cl. 365-189.050.

Nohira, Hiroyuki; Kamei, Masanao; Kanazawa, Hideki; Yamada, Yoko; and Etoh, Yuko, to Canon Kabushiki Kaisha. Optically active compound and liquid crystal composition containing same. 5,073,306, Cl. 252-299.610.

Nojima, Hisatake: *See*—
Nojima, Youko; and Nojima, Hisatake, 5,073,311, Cl. 261-93.000.

Nojima, Youko; and Nojima, Hisatake, to Yuugen Saisha Parasight. Multiple-gas-phase liquid treatment apparatus. 5,073,311, Cl. 261-93.000.

Nojo, Shigenobu: *See*—
Inagawa, Hideho; and Nojo, Shigenobu, 5,073,687, Cl. 219-121.700.

Nokia-Mobira Oy: *See*—
Ylivakeri, Matti, 5,073,973, Cl. 455-76.000.

Noland, John; and Velazquez, Luis A., to Roy F. Weston, Inc. Apparatus and method for low temperature thermal stripping of volatile organic compounds from soil with non-oxidative cross-sweep gases. 5,072,674, Cl. 110-346.000.

Nolet, Stephen G.: *See*—
Koppernaes, Christian; Nolet, Stephen G.; and Fanucci, Jerome P., 5,073,413, Cl. 427-356.000.

Nomura, Manabu: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.

Nomura, Norimasa; and Nishihata, Masahiro, to Kabushiki Kaisha Toshiba. Line connection switching apparatus for connecting communication line in accordance with matching result of speech pattern. 5,073,921, Cl. 379-100.000.

Nomura, Takao: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.

Nomura, Yoshinori; and Ogata, Hitoshi, to Optoelectronics Technology Research Corporation. Semiconductor light emitting device including a hole barrier contiguous to an active layer. 5,073,805, Cl. 357-17.000.

Norddeutsche Seekabelwerke AG: *See*—
Sieksmeyer, Rolf; and Wittek, Jurgen, 5,073,256, Cl. 210-151.000.

Norderney Investments Limited: *See*—
Okhai, Aziz A., 5,072,841, Cl. 215-1.00C.

Nordictrack, Inc.: *See*—
Peterson, Stephen S.; Blawd, Harold C.; Heutmaker, Michael E.; Engel, Timothy S.; and Iverson, Robert A., 5,072,929, Cl. 272-72.000.

Norgauer, Rainer: *See*—
Leiberoth-Leden, Bernd; and Norgauer, Rainer, 5,072,708, Cl. 123-399.000.

Northern Telecom Limited: *See*—
Offers, Albert G.; White, Christopher D.; and Story, Roderick B., 5,073,923, Cl. 379-165.000.
Walling, Jorg-Hein; Axiuk, Oleg; and Dickenson, Robert, 5,073,682, Cl. 174-70.00A.

Norton, William W.: *See*—
Chili, Danilo; Bragos, Ramon; Norton, William W.; and Rak, Stanley F., 5,073,255, Cl. 210-96.100.

Nose, Katsuhiko; Kuze, Katsuaki; and Tatsuta, Hideaki, to Toyo Boseki Kabushiki Kaisha; and Kabushiki Kaisha Boron International. Thermoplastic laminated film. 5,073,455, Cl. 428-411.100.

Noshi, Naoya: *See*—
Ito, Shinichi; Noshi, Naoya; and Okamoto, Yutaka, 5,073,514, Cl. 437-44.000.

Nottrott, Rudolf, to TRW Daut & Rietz GmbH & Co. KG. Flat contact spring for plugs of electrical plug and socket connections. 5,073,132, Cl. 439-884.000.

Noujain, Elie G. Reservoir razor for applying a thin film of metal lubricant onto the blade of the razor and method of shaving. 5,072,512, Cl. 30-41.500.

Nouws, Jacobus A. M.: *See*—
Diepenhorst, Pieter C.; Kool, Pieter; and Nouws, Jacobus A. M., 5,073,647, Cl. 562-27.000.

Novak, John W., Jr.: *See*—
O'Neill, Gary A.; and Novak, John W., Jr., 5,073,272, Cl. 210-728.000.

Noye, Michael E. Heating system control. 5,072,879, Cl. 237-8.00R.

Nozaki, Masahiro, to Toyoda Gosei Co., Ltd. Weather strip for door glass. 5,072,545, Cl. 49-488.000.

NTN Corporation: *See*—
Fujikawa, Yoshio; and Yamazaki, Shizuka, 5,073,037, Cl. 384-120.000.

Nukaya, Yasuyuki, to Ricoh Company, Ltd. Electrophotography type image forming apparatus having improved exchanging kit. 5,073,795, Cl. 355-210.000.

Numata, Hiroki: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Numata, Kunjo; Niikura, Noriyasu; and Kobayashi, Takemi, to NCR Corporation. Print control for dot matrix printer. 5,073,049, Cl. 400-54.000.

Nunes & Duran Pesquisa Comercio e Desenvolvimento Ltda.: *See*—
Nunes, Odilon D.; and Duran, Nelson E. C., 5,073,630, Cl. 530-400.000.

Nunes, Odilon D.; and Duran, Nelson E. C., to Nunes & Duran Pesquisa Comercio e Desenvolvimento Ltda. Polymeric anhydride of magnesium and proteic ammonium phospholinoleate with antiviral, antineoplastic and immunostimulant properties. 5,073,630, Cl. 530-400.000.

Nurayama, Hiroshi: *See*—
Aoyama, Tamoo; Inagami, Yasuhiro; and Nurayama, Hiroshi, 5,073,970, Cl. 395-800.000.

Nussbaum, Gilles: *See*—
Faure, Jean-Francois; Nussbaum, Gilles; and Regazzoni, Gilles, 5,073,207, Cl. 148-2.000.

Oba, Yasuhiko: *See*—
Isozaki, Yoshimasa; and Oba, Yasuhiko, 5,072,644, Cl. 84-609.000.

Obata, Shuichi: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Obata, Tokio; Fujii, Katsutoshi; Narita, Isamu; and Shikita, Shoji, to Ube Industries, Ltd. Aminopyrimidine derivative and insecticide or bactericide containing the derivative. 5,073,558, Cl. 514-259.000.

Obley, Alan L.: *See*—
Harrison, Matthew S.; and Obley, Alan L., 5,073,087, Cl. 416-219.00R.

Obluda, Gerard R.: *See*—
Vogt, Thomas C., Jr.; and Obluda, Gerard R., 5,072,990, Cl. 299-4.000.

Obuvnicky Prumsyl Svit: *See*—
Habrovansky, Josef; Boltnar, Vincenc; Rybka, Jiri ; Korvas, Albin; and Svajda, Jindrich, 5,072,528, Cl. 36-43.000.

Oce Nederland B.V.: *See*—
Van Soest, Hendrikus J. J., 5,072,926, Cl. 271-236.000.
Westdijk, Jacob A., 5,073,953, Cl. 382-9.000.

Ochi, Atsuo: *See*—
Muraji, Tsutomu; Takeuchi, Akihiro; and Ochi, Atsuo, 5,073,826, Cl. 358-335.000.

Ochoa, Sandy, to Tire Service Equipment Mfg. Co., Inc. Pneumatic method and apparatus for seating tubeless tires. 5,072,764, Cl. 157-1.100.

OCN-PPL S.p.A.: *See*—
Gueli, Francesco; and Prandoni, Mario, 5,072,636, Cl. 83-132.000.

O'Connell, Timothy B., to Tuthill Corporation. Swivel bearing. 5,073,038, Cl. 384-206.000.

O'Connor, Ronald M.: *See*—
Greve, Christopher G.; and O'Connor, Ronald M., 5,072,640, Cl. 83-208.000.

Ocsovai, Akos: *See*—
Busai, Gyula; Vegh, Gyorgyi; Losonczi, Zoltan; Ocsovai, Akos; Pozsonyi, Istvan; Szabo, Gyorgy; and Vajo, Gyorgy, 5,073,742, Cl. 313-318.000.

Oda, Tomio: *See*—
Ueno, Ryuzo; Ueno, Ryuji; Kato, Ichie; and Oda, Tomio, 5,073,569, Cl. 514-530.000.

Odajima, Hideo, to Mitsubishi Pencil Co., Ltd. Diaphragm for acoustic equipment. 5,072,806, Cl. 181-170.000.

Offers, Albert G.; White, Christopher D.; and Story, Roderick B., to Northern Telecom Limited. Private telephone system with unified command feature. 5,073,923, Cl. 379-165.000.

Oficina de Investigacion Agrupada: *See*—
Lababia Del Fresno, Miguel, 5,072,665, Cl. 99-391.000.

Ogata, Hitoshi: *See*—
Nomura, Yoshinori; and Ogata, Hitoshi, 5,073,805, Cl. 357-17.000.

Ogawa, Kazuo, to Toyoda Gosei Co., Ltd. Weather strip for use in automobile. 5,072,546, Cl. 49-491.000.

Ogawa, Keikitsu; Takeda Sunoa; Hyogo, Mitsushi; and Shindo, yoshiaki, to Nihon Kohden Corporation. Non-invasive automatic blood pressure measuring apparatus. 5,072,736, Cl. 128-680.000.

Ogawa, Kimiaki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Position sensing device. 5,073,790, Cl. 354-400.000.

Ogawa, Osamu: *See*—
Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, 5,072,813, Cl. 188-322.150.

Ogden, G. Richard: *See*—
Martin, Richard R.; Ogden, G. Richard; and Rodden, Paul M., 5,073,105, Cl. 431-116.000.

Ogino, Yozo: *See*—
Hamada, Yoshikazu; Ogino, Yozo; and Ashizawa, Katsuya, 5,072,975, Cl. 292-201.000.

Oh, Bobby Y., to Del Cerro Investment Group, Inc. Stuffed anatomical members. 5,072,998, Cl. 312-204.000.

Oh, Jong H., to Hyundai Electronics Industries Co., Ltd. Bootstrapping level control circuit for word line signal producing circuit in a dram. 5,073,731, Cl. 307-482.000.

Ohashi, Kunio; and Matsumoto, Kunihiko, to Kabushiki Kaisha Toshiba. Carriage controlling apparatus for floppy disk apparatus. 5,073,832, Cl. 360-75.000.

Ohba, Hisao: *See*—
Osawa, Sadao; and Ohba, Hisao, 5,073,464, Cl. 430-30.000.

Ohi Seisakusho Co., Ltd.: *See*—
Muroi, Kishiro; and Koura, Soushichi, 5,072,983, Cl. 296-37.130.

Ohmi, Tadahiro; Miki, Masahiro; Kikuyama, Hirohisa; and Maeno, Matagoro, to Hashimoto Chemical Industries Co., Ltd. Method of anhydrous hydrogen fluoride etching. 5,073,232, Cl. 156-646.000.

Ohnaka, Shuji: *See*—
Matsumoto, Kunihiro; Aoki, Masashi; Ohnaka, Shuji; Motonaga, Hideshi; and Nishino, Yukinobu, 5,073,708, Cl. 250-223.00B.

Ohno, Shigeru: *See*—
Makino, Naonori; Hoshi, Satoshi; Ohno, Shigeru; and Kitatani, Katsuji, 5,073,465, Cl. 430-58.000.

Ohnuki, Yutaka: *See*—
Hamamura, Kichisaburo; Ohnuki, Yutaka; Narabe, Yukio; Hisatake, Yoshihiro; Banba, Takashi; and Kijima, Shizumasa, 5,073,659, Cl. 585-600.000.

Ohonishi, Toshikazu: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Ohsawa, Shigemitsu: *See*—
Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, 5,073,375, Cl. 424-449.000.

Ohsugi, Hiroshi: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Ohtagaki, Shigeki: *See*—
Wada, Shunichi; and Ohtagaki, Shigeki, 5,072,965, Cl. 280-707.000.

Ohtoshi, Tsukuru: *See*—
Uomi, Kazuhisa; Ohtoshi, Tsukuru; Tsuchiya, Tomonobu; Sasaki, Shinji; and Chinone, Naoki, 5,073,892, Cl. 372-45.000.

Ohwa, Yoshio: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Oinaga, Yuji: *See*—
Uchida, Nobuo; Oinaga, Yuji; and Itoh, Mikio, 5,073,871, Cl. 395-425.000.

Oishi, Mitsugu: *See*—
Yamamoto, Tadao; Abe, Tetsuya; Dohi, Masaaki; Hisatomi, Shinichi; Oishi, Mitsugu; Honda, Toshiro; Hayashi, Mitsuo; and Hirono, Takeo, 5,073,468, Cl. 430-110.000.

Ojima, Juji, to NHK Spring Co., Ltd. Belt or chain tensioner for power transmitting system. 5,073,158, Cl. 474-138.000.

Oka, Kengo; and Yabuki, Yoshikazu, to Sumitomo Rubber Industries, Ltd. Golf ball. 5,072,945, Cl. 273-232.000.

Oka, Kengo: *See*—
Nakahara, Akihiro; Yamada, Mikio; Ebisuno, Tadahiro; Sasaki, Takashi; and Oka, Kengo, 5,072,944, Cl. 273-220.000.

Okada, Naoyuki, to Canon Kabushiki Kaisha. Communication terminal apparatus. 5,073,922, Cl. 379-164.000.

Okada, Setsuo: *See*—
Terashita, Takaaki; and Okada, Setsuo, 5,073,008, Cl. 359-589.000.

Okada, Yoshio: *See*—
Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, 5,073,725, Cl. 307-427.000.

Okamoto, Nobuo: *See*—
Maruyama, Masao; Kozakura, Nobuto; Nakakubo, Katsuya; and Okamoto, Nobuo, 5,073,149, Cl. 474-104.000.

Okamoto, Yutaka: *See*—
Ito, Shinichi; Noshi, Naoya; and Okamoto, Yutaka, 5,073,514, Cl. 437-44.000.

Okazaki, Haruki: *See*—
Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, 5,072,995, Cl. 303-100.000.

Okazaki, Takahisa; Okumoto, Shinichi; and Nakajima, Hirotaka, to Kabushiki Kaisha Toshiba. Ultrasonic imaging apparatus. 5,072,735, Cl. 128-660.070.

Okhai, Aziz A., to Norderney Investments Limited. Plastic containers. 5,072,841, Cl. 215-1.00C.

Oki Electric Industry Co., Ltd.: *See*—
Itoh, Toshikazu; and Suemune, Toshiroh, 5,073,861, Cl. 364-550.000.

Oki, T. Jack. Multi function steering mechanism for a motor vehicle. 5,072,628, Cl. 74-484.00R.

Oki, Toshikazu: *See*—
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 5,073,549, Cl. 514-183.000.

Okoshi, Hitoshi: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Okuda, Kenichi: *See*—
Nishitake, Hideki; Ishikawa, Toshihiro; Kore, Haruhisa; Okuda, Kenichi; and Murashige, Kazuhiro, 5,072,966, Cl. 280-730.000.

Okumoto, Shinichi: *See*—
Okazaki, Takahisa; Okumoto, Shinichi; and Nakajima, Hirotaka, 5,072,735, Cl. 128-660.070.
Okumura, Takao: *See*—
Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.
Okushima, Takehiko: *See*—
Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.
Olah, George A. Environmentally safe catalytic alkyation using liquid onium poly (hydrogen fluorides). 5,073,674, Cl. 585-725.000.
Olbrich, Michael E., to Phillips Petroleum Company. Catalyst and process for dehydrogenation and dehydrocyclization. 5,073,662, Cl. 585-660.000.
O'Leary, Robert K.; and McBrayer, Patrick A., to Osteotech, Inc. Flowable demineralized bone powder composition and its use in bone repair. 5,073,373, Cl. 424-422.000.
O'Lenick, Anthony J., Jr., to Siltech Inc. Silicone amphoteric polymers. 5,073,619, Cl. 528-26.000.
Olin Corporation: *See*—
Braden, Jeffrey S., 5,073,521, Cl. 437-209.000.
Olsen, Robert: *See*—
Marco, Leslie S.; and Olsen, Robert, 5,072,829, Cl. 206-162.000.
Olsson, Lennart, to Receptron. Composite binding site drugs. 5,073,540, Cl. 514-3.000.
Olympus Optical Co., Ltd.: *See*—
Nakagawa, Chihiro; Fukuda, Hiroyuki; Sasaki, Hiroshi; Mogi, Chikako; and Yamada, Hidetoshi, 5,073,820, Cl. 358-133.000.
Omori, Toshimichi: *See*—
Matsumoto, Kazuaki; Omori, Toshimichi; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 5,073,211, Cl. 148-120.000.
Omura, Atsushi: *See*—
Takagi, Masaaki; Nakamura, Shigekazu; and Omura, Atsushi, 5,073,710, Cl. 250-231.140.
Omura, Etsuji, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor Laser. 5,073,895, Cl. 372-47.000.
Ona, Isao; Ozaki, Masaru; and Kurusu, Hidetoshi, to Toray Silicone Company, Ltd. Fiber-treatment agent. 5,073,275, Cl. 252-8.600.
Ona, Isao; and Naganawa, Tsutomu, to Dow Corning Toray Silicone Company, Ltd. Bladder lubricant composition for tire molding. 5,073,608, Cl. 525-477.000.
Ona, Isao: *See*—
Ozaki, Masaru; and Ona, Isao, 5,073,593, Cl. 524-767.000.
Onaya, Masato: *See*—
Tanno, Masaya; and Onaya, Masato, 5,073,733, Cl. 307-590.000.
O'Neill, Gary A.; and Novak, John W., Jr., to Aluminum Company of America. Method for using a flocculant powder. 5,073,272, Cl. 210-728.000.
Ono, Satoshi: *See*—
Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 5,073,965, Cl. 382-47.000.
Ono, Taizo; Sakamoto, Hirotsugu; Katayama, Yoshihiro; and Saitoh, Toshi, to Matsushita Electric Industrial Co., Ltd. Toner sealing arrangement for a dry developing device of an electrostatic copier. 5,073,797, Cl. 355-215.000.
Onogi, Katsuyuki: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.
Onuma, Shigeharu: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.
oosterhuis, Nicholaas M. G.; and Koerts, Kees. Apparatus for controlling and performing a microbiological or enzymatic plug flow process. 5,073,496, Cl. 435-289.000.
Optec D.D. Melco Laboratory Co., Ltd.: *See*—
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.
Optec Dai-Ichi Denko Co., Ltd.: *See*—
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.
Optoelectronics Technology Research Corporation: *See*—
Nomura, Yoshinori; and Ogata, Hitoshi, 5,073,805, Cl. 357-17.000.
Orihashi, Hatsuo: *See*—
Yamada, Sohei; and Orihashi, Hatsuo, 5,072,819, Cl. 193-35.00R.
Osaka Gas Co., Ltd.: *See*—
Toyonaga, Hajime; Nishida, Toshio; Takeishi, Yasuo; and Shiomi, Masao, 5,073,106, Cl. 431-285.000.
Osawa, Sadao; and Ohba, Hisao, to Fuji Photo Film Co., Ltd. Method of processing electrophotographic lithographic printing plate precursors. 5,073,464, Cl. 430-30.000.
Oshidari, Toshikazu, to Nissan Motor Company, Ltd. Planetary gear type multistage transmission. 5,073,160, Cl. 475-281.000.
Oskar Frech GmbH & Co.: *See*—
Fink, Roland, 5,072,778, Cl. 164-316.000.
Osteotech, Inc.: *See*—
O'Leary, Robert K.; and McBrayer, Patrick A., 5,073,373, Cl. 424-422.000.
Ostoja-Starzewski, Karl-Heinz A., to Bayer Aktiengesellschaft. Highly effective polarizers. 5,073,014, Cl. 359-490.000.
Otani, Susumu; and Endo, Syouji, to NEC Corporation. Synchronization word detection apparatus. 5,073,906, Cl. 375-116.000.
Otis Elevator Company: *See*—
Kruse, Michael; and Riedel, Hans-Dietrich, 5,072,821, Cl. 198-327.000.
Steffen, Matthias; and Wente, Gerald, 5,072,820, Cl. 198-323.000.
Otten, Jay G.; Parker, Edward J.; and Kinnaird, Michael G., to BASF Corporation. Stable alkyl and/or aryl silyl ether capped polyether surfactants for liquid cleaning agents containing hypohalite bleaches. 5,073,286, Cl. 252-97.000.
Ougarane, Lahcen: *See*—
Larue, Jean-Pierre; Marie, Bruno; Marot, Christine; Ougarane, Lahcen; and Van der Have, Philippe, 5,073,897, Cl. 372-59.000.
Ouhadi, Trazollah: *See*—
Puydak, Robert C.; Hazelton, Donald R.; and Ouhadi, Trazollah, 5,073,597, Cl. 525-193.000.
Ouig, Gary F., to INCO Limited. Pneumatic size separator for nickle-containing particles. 5,073,252, Cl. 209-139.100.
Outboard Marine Corporation: *See*—
Schmidt, Rick A.; Smith, LaVerne D.; and VanRens, Russell J., 5,073,100, Cl. 425-192.00R.
Ouwinga, Ross A.: *See*—
Bowden, David R.; Ouwinga, Ross A.; and Zandstra, Lawrence D., 5,073,028, Cl. 356-402.000.
Ovens, Kevin M., to Texas Instruments Incorporated. Active load for ECL type outputs. 5,073,728, Cl. 307-455.000.
Overman, Kenneth. Rotary engine and method. 5,072,705, Cl. 123-231.000.
Owada, Nobuo; Yamaguchi, Hizuru; Ozono, Sekiko; and Yasuda, Atsumi, to Hitachi, Ltd. Semiconductor integrated circuit device and manufacturing method thereof. 5,073,810, Cl. 357-34.000.
Owen, Hartley, to Mobil Oil Corporation. Heavy oil catalytic cracking process and apparatus. 5,073,249, Cl. 208-48.00Q.
Owen, Hartley: *See*—
Beech, James H., Jr.; Owen, Hartley; Ramage, Michael P.; and Tabak, Samuel A., 5,073,351, Cl. 422-190.000.
Ozaki, Masahiro; and Rifu, Toshihiro, to Kabushiki Kaisha Toshiba. Computerized tomographic apparatus. 5,073,911, Cl. 378-17.000.
Ozaki, Masaru; and Ona, Isao, to Dow Corning Toray Silicone Company, LTD. Method for making microemulsions of organopolysiloxanes containing cyclohexylamino groups. 5,073,593, Cl. 524-767.000.
Ozaki, Masaru: *See*—
Ona, Isao; Ozaki, Masaru; and Kurusu, Hidetoshi, 5,073,275, Cl. 252-8.600.
Ozono, Sekiko: *See*—
Owada, Nobuo; Yamaguchi, Hizuru; Ozono, Sekiko; and Yasuda, Atsumi, 5,073,810, Cl. 357-34.000.
Paccagnella, Giuseppe. Machine for the continuous contact exposure of photosensitive materials. 5,073,792, Cl. 355-97.000.
Pace, Wilson D., to Motorola, Inc. Start circuit for a power supply control integrated circuit. 5,073,850, Cl. 363-89.000.
Padgett, Myron G.: *See*—
Zarabadi, Seyed R.; Padgett, Myron G.; and Kennedy, Richard A., 5,073,975, Cl. 455-161.000.
Padgett, Richard M. Computer paper tab stripper. 5,072,869, Cl. 225-106.000.
Pai, Chung-Jen. Structure of motorized toothbrush with serving period indication. 5,072,477, Cl. 15-22.100.
Palladino, John V., to Du Pont de Nemours, E. I., and Company. Multilayer printed circuit board formation. 5,073,456, Cl. 428-446.000.
Pan, Yuh-Guo; Chan, Alexander; and Hochman, Lana, to Clairol Incorporated. Dye couplers. 5,073,173, Cl. 8-405.000.
Panama, Julio R.: *See*—
Atwell, William A.; Domingues, David J.; Beckmann, Paul J.; Panama, Julio R.; and Fahrenholtz, Steven K., 5,073,392, Cl. 426-231.000.
Panasewicz, Dale A.: *See*—
Knight, Delos L., III; Panasewicz, Dale A.; and Saunders, Craig M., 5,073,390, Cl. 426-113.000.
Panno, Ralph J.: *See*—
Addison, Mark K.; Campbell, William F.; and Panno, Ralph J., 5,073,224, Cl. 156-382.000.
Panosh, Richard: *See*—
Rapoport, Uri; and Panosh, Richard, 5,072,732, Cl. 128-653.200.
Paolella, Arthur, to United States of America, Army. Optical control of a microwave switch. 5,073,718, Cl. 250-551.000.
Paolella, Arthur: *See*—
Sturzebecher, Dana J.; and Paolella, Arthur, 5,073,717, Cl. 250-551.000.
Parekh, Ebrahim; Jensen, Jack E.; and Summers, Jeffrey L., to General Dynamics Corporation/Convair Division. Threaded split-bushing fastener assembly. 5,073,072, Cl. 411-354.000.
Parekh, Shashi L.: *See*—
Avakian, Roger W.; Parekh, Shashi L.; Shenian, Popkin; and Teutsch, Erich O., 5,073,416, Cl. 428-2.000.
Park, Linda S.: *See*—
Curtis, Benson M.; Park, Linda S.; and Cosman, David J., 5,073,627, Cl. 530-351.000.
Parker, Dane K.: *See*—
Schulz, Gerald O.; and Parker, Dane K., 5,073,592, Cl. 524-750.000.
Parker, Edward J.: *See*—
Otten, Jay G.; Parker, Edward J.; and Kinnaird, Michael G., 5,073,286, Cl. 252-97.000.

Parker, J. Bradford: *See—*
Siegel, Kenneth P.; Parker, J. Bradford; and Wroclawski, John, 5,073,852, Cl. 395-700.000.

Parkhill, Alan J.; and Cook, Roy P., to Banner American Products, Inc. Combined laminating and binding machine. 5,073,076, Cl. 412-33.000.

Parks, Raymond. Buoyant marker. 5,073,135, Cl. 441-6.000.

Parks, Stephen K.; and Fishman, Udi, to Medical Innovations Corporation. Method and apparatus for emplacement of a gastrostomy catheter. 5,073,166, Cl. 609-93.000.

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Patel, Piyush G., to Intel Corporation. Method and apparatus for testing memory. 5,073,891, Cl. 371-21.300.

Patillo, Ronald L.; and Steele, Charles E., to Kerr Manufacturing Company. Electrically heated wax shaping tool. 5,073,696, Cl. 219-233.000.

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Pellico, Michael A. Foamable fluoride gels and method. 5,073,363, Cl. 424-49.000.

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Pethers, Peter C., to Trico Products Corporation. Pivot joint. 5,073,060, Cl. 403-405.100.

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Philip Morris Incorporated: *See—*
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Philpot, Ivan N.; and Bittick, Bruce G., to Matthews International Corporation. Print analysis system. 5,072,525, Cl. 33-618.000.

Photon Dynamics, Inc.: *See—*
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Picker International, Inc.: *See—*
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Pien, Pao C. Internal combustion engine. 5,072,699, Cl. 123-65.0VC.

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Atwell, William A.; Domingues, David J.; Beckmann, Paul J.; Panama, Julio R.; and Fahrenholtz, Steven K., 5,073,392, Cl. 426-231.000.
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Pingry, Larry J.; and Kunk, LaVern, to Allied Products Corporation. Hoppers for planters. 5,072,676, Cl. 111-63.000.

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Pipalov, Aleksander G. Multi-chamber rotary lobe fluid machine with positive sliding seats. 5,073,097, Cl. 418-175.000.

Pipis, George C.; and Lambert, George L., III, to Siemens Energy & Automation, Inc. Electrical enclosure with trim panel support. 5,072,848, Cl. 220-241.000.

Pistor, Helmut H.; and Brown, James C., to United States of America, Army. Pressure activated film tensioner. 5,073,022, Cl. 352-223.000.

Pitney Bowes Inc.: *See—*
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Pitt, William V. Prefabricated louver. 5,072,561, Cl. 52-473.000.

Plapp, Gunther: *See—*
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Plasma Physics Corp.: *See—*
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Pleva, Walter F. Uniform loading springs of improved configuration. 5,072,917, Cl. 267-162.000.
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Powell, Francis R., to AMP Incorporated. Electrical interconnection system utilizing fluid pressure deformed tubular contact. 5,073,124, Cl. 439-197.000.
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Power-One, Inc.: *See—*
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Price, Frank C. Paint can pour lip. 5,072,847, Cl. 220-733.000.
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Price, Macy J., Jr.; Johnson, Mack E.; and Starkey, Daniel C., to Engineered Data Products, Inc. Tape cartridge storage system. 5,072,838, Cl. 211-162.000.
Price, Robert J., to Caterpillar Inc. Support beam for a vehicle. 5,072,800, Cl. 180-9.480.
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Puydak, Robert C.; Hazelton, Donald R.; and Ouhadi, Trazollah, to Advanced Elastomer Systems, L. P. Dynamically vulcanized alloys having two copolymers in the crosslinked phase and a crystalline matrix. 5,073,597, Cl. 525-193.000.
Quackenbush, Doyle. Gravestone saddle planter. 5,072,542, Cl. 47-41.010.
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Katsuno, Hisashi; and Sugimoto, Michio, 5,073,652, Cl. 585-419.000.
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Cook, C. Edgar; Wani, Mansukh C.; Lee, Yun W.; Reel, Jerry R.; and Rector, Douglas, 5,073,548, Cl. 514-169.000.
Ensor, David S.; and Sem, Gilmore J., 5,072,626, Cl. 73-865.500.
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Revlon, Inc.: *See*—
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RFT S.p.A.: *See*—
Carrara, Mauro, 5,073,329, Cl. 264-297.500.
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Eyraud, Marcel; and Grosjean, Pierre, 5,073,435, Cl. 428-215.000.
Kairy, Mostafa; Tinet, Daniel; and Van Damme, Henri, 5,073,360, Cl. 423-608.000.
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Enloe, Jack H.; Lau, John W.; and Rice, Roy W., 5,073,526, Cl. 501-96.000.
Richard, Francoise: *See*—
Vayssie, Charles; Bauer, Daniel; Richard, Francoise; and Junino, Alex, 5,073,174, Cl. 8-406.000.
Richards, Anthony H., to U.S. Philips Corp. D.C. blocking amplifier. 5,073,760, Cl. 330-252.000.
Richardson-Vicks, Inc.: *See*—
Holeva, Kenneth T.; and Gounaris, Michael C., 5,073,604, Cl. 525-327.800.
Turner, Deborah J.; Mehta, Arvind M.; Foley, Jeanne M.; and Doughty, Darrell G., 5,073,371, Cl. 424-401.000.
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Richter, Thomas A.: *See*—
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Isobe, Tami, 5,073,026, Cl. 356-369.000.
Kosaka, Daisuke; and Konishi, Junichi, 5,073,815, Cl. 357-67.000.
Kubota, Kazunori; and Yamazaki, Hideo, 5,072,920, Cl. 270-53.000.
Nukaya, Yasuyuki, 5,073,795, Cl. 355-210.000.
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Ozaki, Masahiro; and Rifu, Toshihiro, 5,073,911, Cl. 378-17.000.
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Wilson, Jerry F., 5,072,876, Cl. 229-40.000.
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Long, Martin W.; Fry, Charles B.; Rix, David M.; and Krivoy, Raul, 5,072,709, Cl. 123-446.000.
Ro, Abraham E. Nail clipper. 5,072,511, Cl. 30-28.000.
Roach, Max J.; and Whitehead, John A. Pipeline monitoring and leak containment system and apparatus therefor. 5,072,622, Cl. 73-40.50R.
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Bischof, Hubert; Konigorski, Ulrich-Eugen; and Kirberg, Uwe, 5,072,804, Cl. 180-142.000.
Eblen, Ewald; Hofmann, Karl; Schmitt, Alfred; Straubel, Max; and Truong-Canh, Hung, 5,072,706, Cl. 123-297.000.
Hans, Waldemar; and Bensch, Guenther, 5,072,885, Cl. 239-466.000.
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.
Leiberoth-Leden, Bernd; and Norgauer, Rainer, 5,072,708, Cl. 123-399.000.
Steinbrenner, Ulrich; Plapp, Gunther; and Wagner, Wolfgang, 5,072,712, Cl. 123-489.000.
Weyl, Helmut, 5,073,247, Cl. 204-428.000.
Robinson, Joel D.: *See*—
Jackson, Donald T.; and Robinson, Joel D., 5,073,692, Cl. 219-86.800.
Roccon, Roberto; and Schwager, Martin, to Maschinenfabrik Rieter AG. Apparatus for depositing card slivers in rotating cans. 5,072,492, Cl. 19-159.00R.
Rochester Gauges, Inc.: *See*—
Taylor, Carl A.; and Hrncir, Robert E., 5,072,618, Cl. 73-317.000.
Rockwell International Corporation: *See*—
Brooks, Lawrence D., 5,073,025, Cl. 356-367.000.
Cichy, Daniel R., 5,072,894, Cl. 244-91.000.
Sutton, Robert F.; Scharrer, Joseph K.; and Beatty, Robert F., 5,073,036, Cl. 384-107.000.
Rockwood, Alan L.: *See*—
Smith, Richard D.; Udseth, Harold R.; and Rockwood, Alan L., 5,073,713, Cl. 250-282.000.

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Martin, Richard R.; Ogden, G. Richard; and Rodden, Paul M., 5,073,105, Cl. 431-116.000.

Rodder, Mark S., to Texas Instruments Incorporated. Method of fabricating a vertical FET device with low gate to drain overlap capacitance. 5,073,519, Cl. 437-180.000.

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Rogers Corporation: *See*—
Nelson, Gregory H., 5,072,520, Cl. 29-852.000.

Rohland, William S.: *See*—
Matyas, Stephen M.; Johnson, Donald B.; Le, An V.; Martin, William C.; Prymak, Rostislaw; Rohland, William S.; and Wilkins, John D., 5,073,934, Cl. 380-30.000.

Rohm, Gunter H.: *See*—
Mack, Hans-Dieter, 5,072,954, Cl. 279-60.000.

Rohm and Haas Company: *See*—
Johnson, Wayne O., 5,073,188, Cl. 71-92.000.
LeSota, Stanley, 5,073,582, Cl. 524-44.000.

Rohr, Jochen. Floating grab dredge and unloading method therefor. 5,072,991, Cl. 299-9.000.

Rohrlach, Milo L.; and Hall, William J., to Bridgestone Australia Ltd. Vehicle inner panel. 5,073,318, Cl. 264-46.500.

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Cooper, Brian G., 5,073,086, Cl. 416-96.00R.
Hirst, Roy T., 5,073,084, Cl. 415-209.300.

Roman, Gianfranco, to Claber S.p.A. Male-female fitting element, in particular for hoses having a large diameter. 5,072,971, Cl. 285-88.000.

Rometsch, Werner: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

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Musumeci, Salvatore; and Ronsisvalle, Cesare, 5,073,511, Cl. 437-40.000.

Rontgen, Manfred, to A. Monforts GmbH & Co. Endless chain for a traveling web transport assembly of a textile machine. 5,072,824, Cl. 198-500.000.

Root-Lowell Corporation: *See*—
Ellison, Garry L.; and Sears, Kim W., 5,072,884, Cl. 239-373.000.

Rosch, Wilhelm. Hinged multiple garment hanger. 5,072,837, Cl. 211-116.000.

Rosenauer, Otto: *See*—
Gebauer, Gerhard; Goes, Wilfried; and Rosenauer, Otto, 5,073,092, Cl. 417-383.000.

Rosenthal, David S. H., to Sun Microsystems, Inc. X window security system. 5,073,933, Cl. 380-25.000.

Ross, Douglas A.: *See*—
Chaklader, Asoke C. D.; Butters, Robert G.; and Ross, Douglas A., 5,073,193, Cl. 75-346.000.

Rossio, Charles E.; and Anderson, Theodore E., to Diversey Corporation. Composition for inhibiting stress cracks in plastic articles and methods of use therefor. 5,073,280, Cl. 252-49.300.

Rossum, David P., to E-mu Systems, Inc. Output stage for a multitimbral electronic musical instrument providing automatic detection of the use of submix outputs. 5,072,645, Cl. 84-660.000.

Roth, Gary S.: *See*—
Guro, David E.; Kumar, Ravi; Nicholas, David M.; and Roth, Gary S., 5,073,356, Cl. 423-415.00A.

Rothstein, Steven: *See*—
Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., 5,073,677, Cl. 800-205.000.

Roufa, Dikla G.: *See*—
Marshall, Lucia G. I.; Patel, Kanaiyalal R.; and Roufa, Dikla G., 5,073,543, Cl. 514-21.000.

Roush, David M.; Davis, Steven G.; Lutomski, Kathryn A.; Meier, Gary A.; Phillips, Richard B.; and Burkart, Susan E., to FMC Corporation. Ethynylbenzothiophene pesticides. 5,073,564, Cl. 514-365.000.

Rousseau, Alain: *See*—
Martinoli, Jean-Luc; Rousseau, Alain; and Vilain, Pascal, 5,072,610, Cl. 73-64.100.

Rowley, Curtis E.: *See*—
Baer, Patrick H.; Connolly, Timothy F.; Kopinski, Gerald P.; Rowley, Curtis E.; and Senkow, Anthony W., 5,072,613, Cl. 73-119.00R.

Roy F. Weston, Inc.: *See*—
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Rubbermaid Incorporated: *See*—
Lancelot, Charles J.; Shaw, Anthony F.; and Tate, Edward O., Jr., 5,073,428, Cl. 428-67.000.

Rubiano, Alfred. Polishing pad cleaning apparatus. 5,072,475, Cl. 15-3.000.

Rudella, Michael A.: *See*—
Gates, Jackson; Hawkins, Robert L.; Larson, Alan R.; Perove, David A.; and Rudella, Michael A., 5,073,819, Cl. 358-107.000.

Ruechner, Ronald A.: *See*—
Maracas, George N.; Ruechner, Ronald A.; and Gerber, Donald S., 5,073,230, Cl. 156-631.000.

Rufenacht, Werner: *See*—
Mulhaupt, Rolf; and Rufenacht, Werner, 5,073,601, Cl. 525-109.000.

Ruff, Gary F.; Voss, Karl D.; Naysmith, Peter M., Jr.; and De Rupa, James L., to CMI International, Inc. Mold and method for making variable hardness castings. 5,072,773, Cl. 164-127.000.

Rutiser, Sylvia: *See*—
Spector, Avner; Rutiser, Sylvia; and Barnea, Daniel, 5,072,733, Cl. 128-660.030.

Rybka, Jiri : *See*—
Habrovansky, Josef; Boltnar, Vincenc; Rybka, Jiri ; Korvas, Albin; and Svajda, Jindrich, 5,072,528, Cl. 36-43.000.

Ryder, Fred. Device for removing spikes from shoes. 5,072,634, Cl. 81-176.150.

Ryoko Co., Ltd.: *See*—
Higa, Teruo, 5,073,257, Cl. 210-170.000.

S. C. Johnson & Son, Inc.: *See*—
Tsaur, Sheng-Liang, 5,073,591, Cl. 524-460.000.

Saalfrank, Erwin: *See*—
Schneider, Eckhard; and Saalfrank, Erwin, 5,072,919, Cl. 270-49.000.

Safco Corporation: *See*—
Terrill, Lawrence; and Carr, Francis L., 5,073,721, Cl. 307-10.700.

Safematic Ltd.: *See*—
Lopperi, Esko, 5,072,949, Cl. 277-3.000.

Sagami Chemical Research Center: *See*—
Kobori, Takeo; and Tunemoto, Daiei, 5,073,551, Cl. 514-206.000.

Sahara, Hiroshi: *See*—
Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, 5,073,926, Cl. 379-53.000.

Saijo, Hiroyuki: *See*—
Deguchi, Katsuhiko; Saito, Kozo; and Saijo, Hiroyuki, 5,073,293, Cl. 252-174.170.

Saika, Toshihiro: *See*—
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Saiki, Shuji: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

St. Ours, Thomas A. Heat-intercepting garment or blanket. 5,072,455, Cl. 2-81.000.

St. Thomas, Jeffrey P.: *See*—
Waitts, Robert R.; and St. Thomas, Jeffrey P., 5,073,221, Cl. 156-253.000.

Saito, Keiichi: *See*—
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.

Saito, Kozo: *See*—
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Saito, Makoto; and Gunji, Minoru, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Self-actuated nuclear reactor shutdown system. 5,073,334, Cl. 376-336.000.

Saito, Shiro; Shirai, Kenji; Kawamoto, Ryuichi; and Sakakibara, Shigeru, to Inax Corporation. Method and apparatus for detecting urinary constituents. 5,073,500, Cl. 436-53.000.

Saito, Takayuki; Nakajima, Ken; Iwase, Yoki; Ikeda, Yukio; and Shima, Hiroyuki, to Ebara Corporation; and Ebara Research Co., Ltd. Process and system for purifying pure water or ultrapure water. 5,073,268, Cl. 210-638.000.

Saitoh, Toshi: *See*—
Ono, Taizo; Sakamoto, Hirotsugu; Katayama, Yoshihiro; and Saitoh, Toshi, 5,073,797, Cl. 355-215.000.

Sakabe, Yukio: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.

Sakai, Toshifumi, to Daikyo Co., Ltd. Blowing louver with swinging fins for air conditioners. 5,072,657, Cl. 454-153.000.

Sakakibara, Shigeru: *See*—
Saito, Shiro; Shirai, Kenji; Kawamoto, Ryuichi; and Sakakibara, Shigeru, 5,073,500, Cl. 436-53.000.

Sakamoto, Hirotsugu: *See*—
Ono, Taizo; Sakamoto, Hirotsugu; Katayama, Yoshihiro; and Saitoh, Toshi, 5,073,797, Cl. 355-215.000.

Sakamoto, Keiji; and Iwashita, Yasusuke, to Fanuc Ltd. Speed control method for servomotors. 5,073,746, Cl. 318-560.000.

Sakamura, Ken; Hashimoto, Kouzi; Kawasaki, Ikuya; Hasegawa, Atsushi; and Iwasaki, Kazuhiko, to Hitachi, Ltd.; and Hitachi Microcomputer System, Inc. Method of searching a queue in response to a search instruction. 5,073,856, Cl. 395-375.000.

Sakazaki, Yuji: *See*—
Suzuki, Akinobu; Sakazaki, Yuji; and Nakamura, Takeshi, 5,073,047, Cl. 385-93.000.

Salamo, Gregory J.: *See*—
Sharp, Edward J.; Miller, Mary J.; Clark, William W., III; Wood, Gary L.; and Salamo, Gregory J., 5,073,705, Cl. 250-216.000.

Salcher, Olga: *See*—
Frobel, Klaus; Bischoff, Erwin; Muller, Hartwig; Salcher, Olga; De Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 5,073,369, Cl. 424-121.000.

Saleh, Ramzi Y.; Soled, Stuart L.; and Dispenziere, Nicholas C., to Exxon Chemical Patents Inc. Catalyst comprising TiO_2 dispersed phase on a monolayer of SI_2 on alumina support. 5,073,658, Cl. 585-530.000.

Salt, Howard T.: *See—*
Stott, Christopher; and Salt, Howard T., 5,072,522, Cl. 33-503.000.

Sammons, David w.; Ko, Wen-Jeng; and Liu, Yi-Cheng, to Arizona Technology Development Corp. Computerized method of matching two-dimensional (2-D) patterns. 5,073,963, Cl. 382-30.000.

SamSung Electronics Co., Ltd.: *See—*
Baek, Hoon-Kee, 5,073,837, Cl. 361-92.000.
Kwon, Oh-Hyun; Jang, Taek-Yong; Shin, Jung-Hyun; and Choi, Won-Taek, 5,073,510, Cl. 437-40.000.
Lee, Soo-Cheol, 5,073,513, Cl. 437-43.000.

Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 5,073,620, Cl. 525-68.000.

Sanada, Takashi: *See—*
Abe, Hiroomi; Nishio, Taichi; Mitsui, Kiyoshi; Sogabe, Satoru; and Sanada, Takashi, 5,073,590, Cl. 524-449.000.

Sanden Corporation: *See—*
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Sander, Bruno; Marquardt, Siegfried; Kempe, Uwe; Vodrazka, Wolfgang; and Lueth, Gero, to BASF Aktiengesellschaft. Utilization of soot from synthesis gas production in sewage treatment. 5,073,271, Cl. 210-710.000.

Sandi, Ernesto S.: *See—*
Anderson, Edward A.; Sandi, Ernesto S.; and White, Mary K., 5,073,683, Cl. 174-117.0FF.

Sandia Corporation: *See—*
Skogmo, David G., 5,073,779, Cl. 342-37.000.

Sandig, Hartmut: *See—*
Lauke, Harald; Schuermann, Gregor; Sandig, Hartmut; and Loerzer, Thomas, 5,073,475, Cl. 430-278.000.

Sankyo Company Limited: *See—*
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, 5,073,556, Cl. 514-254.000.

Sanner, Axel: *See—*
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Sano, Haruo: *See—*
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Sano, Hiroshi: *See—*
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Sano, Kazuhide: *See—*
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Sano, Ko: *See—*
Kajiwara, Toshiro; Kobayashi, Goroku; Fukuyama, Keiji; Sano, Ko; Yano, Yojiro; and Watanabe, Keiji, 5,073,743, Cl. 313-346.00R.

Sano, Kohichi; and Hayashi, Toshitada, to Sony Corporation. Head tracking system with memory for storing correct tracking positions. 5,073,835, Cl. 360-77.040.

Sano, Yoshitaka: *See—*
Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 5,073,965, Cl. 382-47.000.

Sanpei, Tetsuya: *See—*
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Sanshin Kogyo Kabushiki Kaisha: *See—*
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Inoue, Seiji, 5,073,133, Cl. 440-1.000.
Shibata, Yasuhiko, 5,072,809, Cl. 184-6.130.

Sansho Co., Ltd.: *See—*
Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, 5,073,375, Cl. 424-449.000.

Santangelo, Francesco: *See—*
Casagrande, Cesare; and Santangelo, Francesco, 5,073,547, Cl. 514-79.000.

Santicchi, Angusto. Segmented belt for use on box-type single-rail overhead conveyors. 5,072,827, Cl. 198-678.100.

Santos, James P. Hand exercise device. 5,072,927, Cl. 272-68.000.

Sanyo Chemical Industries, Ltd.: *See—*
Amano, Yoshiyuki; Kikutake, Jun-ichiro; and Sugiura, Masakazu, 5,073,485, Cl. 435-7.940.

Sanyo Electric Co., Ltd.: *See—*
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, 5,072,526, Cl. 34-60.000.
Sasaki, Tooru; and Hosoya, Nobukazu, 5,073,886, Cl. 369-60.000.
Tanno, Masaya; and Onaya, Masato, 5,073,733, Cl. 307-590.000.

Sappington, Donald R., to Toxoric, Inc. Archery bow sighting device. 5,072,716, Cl. 124-87.000.

Sapre, Ajit V.: *See—*
Herbst, Joseph A.; Markham, Catherine L.; Sapre, Ajit V.; and Teitman, Gerald J., 5,073,349, Cl. 422-144.000.

Sarsfield, Robert T.: *See—*
Carroll, John B.; and Sarsfield, Robert T., 5,072,913, Cl. 251-99.000.

Sasabe, Masazumi: *See—*
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Sasaki, Asao; and Minegishi, Masami, to Fuji Jukogyo Kabushiki Kaisha. Engine shut-down device. 5,072,702, Cl. 123-179.400.

Sasaki, Hiroshi: *See—*
Nakagawa, Chihiro; Fukuda, Hiroyuki; Sasaki, Hiroshi; Mogi, Chikako; and Yamada, Hidetoshi, 5,073,820, Cl. 358-133.000.

Sasaki, Isao; Nishida, Kozi; and Anzai, Hisao, to Mitsubishi Rayon Company, Limited. Methacrylimide containing polymer. 5,073,606, Cl. 525-330.500.

Sasaki, Kikuji: *See—*
Satou, Junya; Murakami, Masatsugi; and Sasaki, Kikuji, 5,073,452, Cl. 428-349.000.

Sasaki, Noboru; and Ueyama, Masayuki, to Tanaka Kikinzoku Kogyo K.K. Method of making electrical contact. 5,072,521, Cl. 29-879.000.

Sasaki, Shinji: *See—*
Uomi, Kazuhisa; Ohtoshi, Tsukuru; Tsuchiya, Tomonobu; Sasaki, Shinji; and Chinone, Naoki, 5,073,892, Cl. 372-45.000.

Sasaki, Takashi: *See—*
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Sasaki, Tooru; and Hosoya, Nobukazu, to Sanyo Electric Co., Ltd. Signal reproducing circuitry and signal reproducing method for optical disc player. 5,073,886, Cl. 369-60.000.

Sasaki, Yoshinori, to NEC Corporation. Servo-controlled actuator with two-peak flux density distribution. 5,073,882, Cl. 369-44.150.

Sato, Hiroaki, to Canon Kabushiki Kaisha. Image data processing apparatus. 5,073,966, Cl. 382-56.000.

Sato, Izumi: *See—*
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.

Sato, Kaoru: *See—*
Suga, Yoshinori; Tanaka, Eiji; Kato, Satoshi; and Sato, Kaoru, 5,073,427, Cl. 428-64.000.

Sato, Katsuaki: *See—*
Yoshida, Hiroko; Serikawa, Mitsuhiko; Kawamura, Akihisa; Matsumoto, Masaharu; and Sato, Katsuaki, 5,073,942, Cl. 381-61.000.

Sato, Kazue: *See—*
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Sato, Michitaka: *See—*
Nishio, Hiroaki; Watanabe, Keiji; and Sato, Michitaka, 5,073,330, Cl. 264-535.000.

Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, to Optec D.D. Melco Laboratory Co., Ltd.; Optec Dai-Ichi Denko Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Photointerruptor for use in optical transmission-type rotary encoder. 5,073,001, Cl. 385-19.000.

Sato, Tsunehiko: *See—*
Chino, Naoyoshi; Hiraki, Yasuhito; Shibata, Norio; and Sato, Tsunehiko, 5,072,688, Cl. 118-411.000.

Satoh, Isao: *See—*
Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, 5,073,887, Cl. 369-100.000.

Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, to Matsushita Electric Industrial Co., Ltd. Thin speaker having an enclosure with an open portion and a closed portion. 5,073,946, Cl. 381-154.000.

Satoh, Nobuyuki: *See—*
Imazu, Katsuhiro; Aizawa, Masanori; Miyazawa, Tetsuo; Satoh, Nobuyuki; and Kobayashi, Seishichi, 5,072,605, Cl. 72-46.000.

Satoh, Tetsuya: *See—*
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 5,073,101, Cl. 425-385.000.

Satoma, Shiro, to Juki Corporation. Needle threading apparatus for a two-needle sewing machine. 5,072,678, Cl. 112-225.000.

Satomi, Mitsuo: *See—*
Hirota, Ken; Satomi, Mitsuo; and Kugimiya, Koichi, 5,073,214, Cl. 148-306.000.

Satou, Junya; Murakami, Masatsugi; and Sasaki, Kikuji, to Toray Industries, Inc. Film for print lamination. 5,073,452, Cl. 428-349.000.

Satta, Masayuki; Takanashi, Katsuya; and Yanagi, Kunihiro, to Hitachi, Ltd. Control method of zooming screen. 5,073,771, Cl. 340-721.000.

Satterfield, Marshall G.: *See—*
Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 5,073,429, Cl. 428-71.000.

Sauder, Charles H.: *See—*
Meives, Otis; Pritzl, Andrew B.; and Sauder, Charles H., 5,072,572, Cl. 53-209.000.

Sauder, Mark L. Universal corner flashing shingle and flashing method. 5,072,552, Cl. 52-58.000.

Saunders, Craig M.: *See—*
Knight, Delos L., III; Panasewicz, Dale A.; and Saunders, Craig M., 5,073,390, Cl. 426-113.000.

Saunders, John: *See—*
Baker, Raymond; Street, Leslie J.; and Saunders, John, 5,073,557, Cl. 514-254.000.

Sayyadi, Babak, to Boeing Company, The. Multiconductor cable stripper. 5,072,632, Cl. 81-9.510.

Scarafia, Liliana: *See*—
Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., 5,073,677, Cl. 800-205.000.

Schad, Robert D.; and Brown, Paul, to Husky Injection Molding Systems Ltd. Injection molding process. 5,073,328, Cl. 264-297.200.

Schaeffer, Dennis R., to Motorola, Inc. Cellular radiotelephone communications system. 5,073,971, Cl. 455-33.000.

Schaffer, Charles W.: *See*—
Leonard, Henry A.; and Schaffer, Charles W., 5,073,064, Cl. 405-259.600.

Schaffer, Ronald R.: *See*—
Mulholland, Denis G.; Schaffer, Ronald R.; and Warner, Gary N., 5,073,042, Cl. 385-69.000.

Schanz, Klaus; Martin, Roland; and Kaufmann, Bruno, to Giulini Chemie GmbH. Gel compositions and cosmetic/compositions containing the same. 5,073,573, Cl. 514-844.000.

Scharf, Max: *See*—
Fry, David, 5,073,222, Cl. 156-267.000.

Scharf, Wolfgang: *See*—
Meier, Kurt; Haug, Theobald; and Scharf, Wolfgang, 5,073,438, Cl. 428-224.000.

Scharr, Thomas A.: *See*—
Liu, Jay J.; Scharr, Thomas A.; and Lytle, William H., 5,072,873, Cl. 228-264.000.

Scharrer, Joseph K.: *See*—
Sutton, Robert F.; Scharrer, Joseph K.; and Beatty, Robert F., 5,073,036, Cl. 384-107.000.

Scheer, Martin: *See*—
Frobel, Klaus; Bischoff, Erwin; Muller, Hartwig; Salcher, Olga; De Jong, Anno; Berschauer, Friedrich; and Scheer, Martin, 5,073,369, Cl. 424-121.000.

Scheffer, Bob; and Kortbeek, Andras G. T. G., to Shell Oil Company. Process for the preparation of hydrocarbons. 5,073,661, Cl. 585-640.000.

Scheffer, Norman: *See*—
Krowl, Thomas R.; and Scheffer, Norman, 5,073,199, Cl. 106-797.000.

Scheibli, Peter, to Ciba-Geigy Corporation. Reactive disazo dyes which contain two aminofluoro-1,3,5-triazinyl radicals. 5,073,631, Cl. 534-634.000.

Schenkemeyer, Erhard: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Schering Aktiengesellschaft: *See*—
Blaszkiewicz, Peter; and Speck, Ulrich, 5,073,362, Cl. 424-5.000.

Schering Corporation: *See*—
McCarty, John A., 5,073,374, Cl. 424-435.000.

Schilcher, Klaus, to Voest-Alpine Industrieanlagenbau G.m.b.H. Continuous casting mold arrangement. 5,072,774, Cl. 164-150.000.

Schilling, Peter, to Westvaco Corporation. Cation-active emulsifier. 5,073,297, Cl. 252-355.000.

Schlegel (UK) Holdings Limited: *See*—
Cook, John E.; and Matsumiya, James, 5,072,567, Cl. 52-716.000.

Schlemmer, Lothar: *See*—
Klimesch, Roger; Bleckmann, Gerhard; Farwerck, Karl-Peter; Schlemmer, Lothar; and Sanner, Axel, 5,073,379, Cl. 424-467.000.

Schlumberger Canada Limited: *See*—
Jeter, John D., 5,073,877, Cl. 367-84.000.

Schmidlin, Fred W.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.

Schmidt, Frederick A.; Wheelock, John T.; and Peterson, David T., to Iowa State University Research Foundation, Inc. Rare earth/iron fluoride and methods for making and using same. 5,073,337, Cl. 420-83.000.

Schmidt, Gary J.: *See*—
Scott, Raymond P. W.; and Schmidt, Gary J., 5,073,345, Cl. 422-70.000.

Schmidt, Rainer: *See*—
Haacker, Heinz; Malik, J. Ernst; and Schmidt, Rainer, 5,072,754, Cl. 137-561.00A.

Schmidt, Rick A.; Smith, LaVerne D.; and VanRens, Russell J., to Outboard Marine Corporation. Clamp assembly. 5,073,100, Cl. 425-192.00R.

Schmitt, Alfred: *See*—
Eblen, Ewald; Hofmann, Karl; Schmitt, Alfred; Straubel, Max; and Truong-Canh, Hung, 5,072,706, Cl. 123-297.000.

Schmitt, Larry D.; and Bailey, David W., to Uniroyal Goodrich Tire Company, The. First stage tire building machine including selectively coupled bead setters and bladder cages. 5,073,225, Cl. 156-401.000.

Schmitz, Gerhard. Internal combustion engine having multiple expansion and compression. 5,072,589, Cl. 60-622.000.

Schneider, Barry L., to Hollister Incorporated. Drainage tube retention device. 5,073,170, Cl. 604-180.000.

Schneider, Claus: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 5,073,671, Cl. 548-348.000.

Schneider, Eckhard; and Saalfrank, Erwin, to MAN ROLAND Druckmaschinen AG. Versatile folding apparatus to provide folded products of selectively different folding patterns. 5,072,919, Cl. 270-49.000.

Schneider, Josef; Fuhrmann, Hartmut; and Kobler, Ingo, to Man Roland Druckmaschinen AG. System and method to apply a printing image on a printing machine cylinder in accordance with electronically furnished image information. 5,072,671, Cl. 101-467.000.

Schneider, Martin: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.

Schoenleber, Donald: *See*—
Parrotta, Michael A.; Grainger, Frederick; and Schoenleber, Donald, 5,072,831, Cl. 206-232.000.

Scholl, Thomas: *See*—
Kohl, Willibald E.; and Scholl, Thomas, 5,073,376, Cl. 424-451.000.

Scholle Corporation: *See*—
Carr, Richard F., 5,072,756, Cl. 137-614.040.

Schommers, Joachim: *See*—
Langer, Michael; and Schommers, Joachim, 5,073,307, Cl. 261-35.000.

Schott Glaswerke: *See*—
Speit, Burkhard, 5,073,524, Cl. 501-60.000.

Schroeder, Daniel; Lam, Kin S.; Mattei, Jacqueline; and Hesler, Grace A., to Bristol-Myers Company. BMY-41950 antitumor antibiotic. 5,073,633, Cl. 540-545.000.

Schubert, Peter: *See*—
Domesle, Rainer; Engler, Bernd; Koberstein, Edgar; and Schubert, Peter, 5,073,532, Cl. 502-304.000.

Schuch, Wolfgang W.: *See*—
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Schuermann, Gregor: *See*—
Lauke, Harald; Schuermann, Gregor; Sandig, Hartmut; and Loerzer, Thomas, 5,073,475, Cl. 430-278.000.

Schuhmacher, Chris A., to NCR Corporation. Multiple beam bar code scanner. 5,073,702, Cl. 235-467.000.

Schule, Earl A. Trailer coupler safety cable device. 5,072,964, Cl. 280-457.000.

Schuler, Andreas: *See*—
Luhrsen, Ernst; Schuler, Andreas; and Hintzen, Ullrich, 5,072,864, Cl. 222-600.000.

Schulte-Schlagbaum Aktiengesellschaft: *See*—
Eisermann, Armin, 5,072,604, Cl. 70-276.000.

Schultz, Herbert V.: *See*—
Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 5,073,370, Cl. 424-195.100.

Schultz, William J.: *See*—
Almer, Carl J.; and Schultz, William J., 5,073,595, Cl. 525-65.000.

Schulz, Gerald O.; and Parker, Dane K., to Goodyear Tire & Rubber Company, The. Process for the preparation of a rubber having polymer bound functionality. 5,073,592, Cl. 524-750.000.

Schumacher, Rolf; Evans, Samuel; and Dubs, Paul, to Ciba-Geigy Corporation. Lubricant composition. 5,073,278, Cl. 252-47.500.

Schutze, Gunter: *See*—
Gatschmann, Klaus G.; and Schutze, Gunter, 5,072,740, Cl. 131-75.000.

Schwabische Huttenwerke GmbH: *See*—
Zaoralek, Heinz-Michael; and Vomhoff, Erich, 5,072,497, Cl. 29-123.000.

Schwager, Martin: *See*—
Roccon, Roberto; and Schwager, Martin, 5,072,492, Cl. 19-159.00R.

Schwaitzberg, Steven D.: *See*—
Carr, Kenneth L.; Grabowy, Richard S.; and Schwaitzberg, Steven D., 5,073,167, Cl. 604-114.000.

Schwalm, Reinhold; Binder, Horst; and Boettcher, Andreas, to BASF Aktiengesellschaft. Radiation-sensitive mixture containing acid labile groups and production of relief patterns. 5,073,474, Cl. 430-270.000.

Schwartz, Abraham, to Caribbean Microparticles Corporation. Microbead reference standard and method of adjusting a flow cytometer to obtain reproducible results using the microbeads. 5,073,497, Cl. 436-8.000.

Schwartz, Abraham; and Repollet, Emma F., to Caribbean Microparticles Corporation. Fluorescent alignment microbeads with broad excitation and emission spectra and its use. 5,073,498, Cl. 436-8.000.

Schwarzenbach, Franz: *See*—
Meier, Kurt; Eugster, Giuliano; Schwarzenbach, Franz; and Zweifel, Hans, 5,073,476, Cl. 430-280.000.

Scott, Lyle. Pipe support stand. 5,072,901, Cl. 248-49.000.

Scott, Raymond E., to Multifastener Corporation. Installation head for attaching female fasteners. 5,072,518, Cl. 29-798.000.

Scott, Raymond P. W.; and Schmidt, Gary J., to Perkin Elmer Corporation, The. Light detector apparatus. 5,073,345, Cl. 422-70.000.

Scott, Wayne A. Starter spring rewinder. 5,072,499, Cl. 29-228.000.

Scozzafava, Michael; Tang, Ching W.; and Littman, Jon E., to Eastman Kodak Company. Organic electroluminescent device with stabilizing fused metal particle cathode. 5,073,446, Cl. 428-323.000.

Sea-Land Service, Inc.: *See*—
Grogan, Charles W., 5,072,845, Cl. 220-1.500.

Seafood Equipment Development Corporation: *See*—
Ellis-Brown, Roy, 5,072,663, Cl. 99-331.000.

Seal, John, to W. C. Bradley Company. Cart assembly for barbecue grills. 5,072,718, Cl. 126-41.00R.

Seal Technology Systems: *See*—
Littleproud, Antony; and Hill, David, 5,072,950, Cl. 277-9.500.
Sealed Air Corporation: *See*—
Reichental, Abraham N.; and Shafir, Alex, 5,072,637, Cl. 83-23.000.
Sears, Kim W.: *See*—
Ellison, Garry L.; and Sears, Kim W., 5,072,884, Cl. 239-373.000.
Secq, Alain: *See*—
Bousquet, Jacques; Catros, Alain; Huynh, Le Xuan; and Secq, Alain, 5,073,309, Cl. 261-29.000.
Seiko Epson Corporation: *See*—
Sonehara, Tomio; Aruga, Shuji; and Morozumi, Shinji, 5,073,013, Cl. 359-63.000.
Takagi, Nobukazu; and Seto, Takeshi, 5,073,093, Cl. 417-410.000.
Seikosha Co., Ltd.: *See*—
Ishikawa, Yasushi; Tomono, Fumio; and Fujita, Tetsuya, 5,072,690, Cl. 118-658.000.
Seive, Alain: *See*—
Petit, Laurent; Bournonville, Jean-Paul; Guth, Jean-Louis; Raatz, Francis; and Seive, Alain, 5,073,672, Cl. 585-415.000.
Sekizawa, Kazuhiko: *See*—
Hara, Yasushi; Suzuki, Nobumasa; Ito, Yukio; and Sekizawa, Kazuhiko, 5,073,649, Cl. 564-479.000.
Selenia Industrie Elettroniche Associate S.p.A.: *See*—
Sparvieri, Nicola; and Cattarin, Paolo, 5,073,359, Cl. 423-594.000.
Seltmann, Hans-Guenter; Haerer, Juergen; and Hoffmann, Hans-Josef, to Henkel Kommanditgesellschaft auf Aktien. Glycidoxypropyl silanol and polydimethyl siloxanes as mold release agents. 5,073,588, Cl. 524-264.000.
Sem, Gilmore J.: *See*—
Ensor, David S.; and Sem, Gilmore J., 5,072,626, Cl. 73-865.500.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Mase, Akira, 5,072,519, Cl. 29-840.000.
Yamazaki, Shunpei, 5,073,535, Cl. 505-1.000.
Senk, Gerald B., Jr.: *See*—
Hale, Roger W.; and Senk, Gerald B., Jr., 5,072,775, Cl. 164-186.000.
Senkow, Anthony W.: *See*—
Baer, Patrick H.; Connolly, Timothy F.; Kopinski, Gerald P.; Rowley, Curtis E.; and Senkow, Anthony W., 5,072,613, Cl. 73-119.00R.
Seno, Kaoru: *See*—
Hagishita, Sanji; and Seno, Kaoru, 5,073,648, Cl. 564-374.000.
Senoo, Takanori: *See*—
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 5,073,925, Cl. 380-3.000.
Seppanen, Helena: *See*—
Partanen, Paul; Seppanen, Helena; and Harjunmaa, Hannu, 5,073,346, Cl. 422-99.000.
Sergi, Joseph B.: *See*—
Viola, Jeffrey P.; and Sergi, Joseph B., 5,073,982, Cl. 359-120.000.
Serikawa, Mitsuhiko: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.
Yoshida, Hiroko; Serikawa, Mitsuhiko; Kawamura, Akihisa; Matsumoto, Masaharu; and Sato, Katsuaki, 5,073,942, Cl. 381-61.000.
Servio: *See*—
Martinoli, Jean-Luc; Rousseau, Alain; and Vilain, Pascal, 5,072,610, Cl. 73-64.100.
Seto, Kunio; Yamamoto, Chizuko; and Watanabe, Kiyoshi, to Canon Kabushiki Kaisha. Graphic editing system. 5,073,957, Cl. 382-22.000.
Seto, Takeshi: *See*—
Takagi, Nobukazu; and Seto, Takeshi, 5,073,093, Cl. 417-410.000.
SGS-Thomson Microelectronics S.r.l.: *See*—
Botti, Edoardo; and Torazzina, Aldo, 5,073,811, Cl. 357-34.000.
Musumeci, Salvatore; and Ronsisvalle, Cesare, 5,073,511, Cl. 437-40.000.
Shafir, Alex: *See*—
Reichental, Abraham N.; and Shafir, Alex, 5,072,637, Cl. 83-23.000.
Shanelec, Dennis A. Molded polypropylene foam tire cores. 5,073,444, Cl. 428-313.500.
Shankland, Ian R.: *See*—
Wilson, David P.; Shankland, Ian R.; and Lund, Earl A. E., 5,073,206, Cl. 134-40.000.
Shannon, Joseph W., to ABCC/TechCorp. Apparatus and technique for setting brix in a soft drink dispenser. 5,072,853, Cl. 222-1.000.
Shannon, Paul J.; Sun, Shao-Tang; and Swetlin, Brian J., to Hercules Incorporated. Process of preparing compositions having multiple oriented mesogens. 5,073,294, Cl. 252-299.010.
Sharp, Bruce R. Storage tank systems having in situ formed inner tank. 5,072,609, Cl. 73-49.200.
Sharp Corporation: *See*—
Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, 5,073,725, Cl. 307-427.000.
Sharp, Edward J.; Miller, Mary J.; Clark, William W., III; Wood, Gary L.; and Salamo, Gregory J., to United States of America, Army. Broadband, multi-line, optical power limiting scheme. 5,073,705, Cl. 250-216.000.
Sharp Kabushiki Kaisha: *See*—
Nakai, Yoshiyuki; Maruta, Kazuo; Nakajima, Tatsushi; and Kawanaka, Seido, 5,073,960, Cl. 382-22.000.
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Shaw, Anthony F.: *See*—
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Shaw, Richard J.: *See*—
Bojar, James A.; and Shaw, Richard J., 5,072,482, Cl. 15-180.000.
Sheehan, Philip W.: *See*—
Budd, James M.; Sheehan, Philip W.; and Warren, John H., 5,072,611, Cl. 73-118.100.
Sheesley, Wilmer L.: *See*—
Birch, Norman R.; Dunbar, James G.; Kerlin, Harold W.; Sheesley, Wilmer L.; and Vees, Edward C., 5,073,123, Cl. 439-188.000.
Sheets, Charles E.: *See*—
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Shell Internationale Research Maatschappij B.V.: *See*—
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Shell Oil Company: *See*—
Castro, Cesar O., 5,073,414, Cl. 427-423.000.
DuBois, Donn A., 5,073,610, Cl. 526-194.000.
Gorman, John Eugene; and Morris, John A., 5,073,600, Cl. 525-264.000.
Hale, Arthur H.; and Blytas, George C., 5,072,794, Cl. 175-50.000.
Hertzenberg, Elliot P.; Murray, Brendan D.; Pasquale, Gary M.; and Winquist, Bruce H. C., 5,073,668, Cl. 585-739.000.
Hwo, Charles C.; and Watkins, Larry K., 5,073,458, Cl. 428-516.000.
Klingensmith, George B.; and Campbell, Randolph N., 5,073,327, Cl. 264-290.200.
Scheffer, Bob; and Kortbeek, Andras G. T. G., 5,073,661, Cl. 585-640.000.
Tonks, Gregory V.; and Verstappen Declercq, Anne E. L. M. M., 5,073,667, Cl. 585-738.000.
Tsiang, Raymond C., 5,073,621, Cl. 528-483.000.
Shelleman, Richard A.: *See*—
Farooq, Shaji; Natarajan, Govindarajan; Reddy, Srinivasa S. N.; Shelleman, Richard A.; Stoffel, Nancy C.; and Vallabhaneni, Rao V., 5,073,180, Cl. 65-18.400.
Shen, Jian-Kuo: *See*—
Staplin, Deborah K.; Shen, Jian-Kuo; and Miu, Ming-Tzer, 5,073,855, Cl. 395-375.000.
Shen, Jyi-Sheng J., to Continental Polymers, Inc. High temperature heat resistant acrylics. 5,073,615, Cl. 526-262.000.
Shen, Zhonghou; Xu, Yiji; and Wang, DeXin, to University of Petroleum, China. Boring bit. 5,072,796, Cl. 175-340.000.
Sheng, Zhengzhi; and Herman, Allen M., to University of Arkansas, The. High temperature superconductors comprising Tl—Ca—Ba—O, Tl—Sr—Ba—Cu—O, or Tl—Sr—Cu—O. 5,073,536, Cl. 505-1.000.
Shenian, Popkin: *See*—
Avakian, Roger W.; Parekh, Shashi L.; Shenian, Popkin; and Teutsch, Erich O., 5,073,416, Cl. 428-2.000.
Sherrick, Ronald E., to Babcock & Wilcox Company, The. Fiber optic level alarm. 5,072,616, Cl. 73-293.000.
Shervington, Roger M., to Sundstrand Corporation. Bearing assembly with thermal compensation. 5,073,039, Cl. 384-278.000.
Shibata, Norio: *See*—
Chino, Naoyoshi; Hiraki, Yasuhito; Shibata, Norio; and Sato, Tsunehiko, 5,072,688, Cl. 118-411.000.
Shibata, Yasuhiko, to Sanshin Kogyo Kabushiki Kaisha. Lubricating device for four stroke outboard motor. 5,072,809, Cl. 184-6.130.
Shibuya Kogyo Co., Ltd.: *See*—
Matsumoto, Kunihiro; Aoki, Masashi; Ohnaka, Shuji; Motonaga, Hideshi; and Nishino, Yukinobu, 5,073,708, Cl. 250-223.00B.
Shigemori, Toshihiro, to Ricoh Company, Ltd. Data modulating system. 5,073,776, Cl. 341-106.000.
Shigezawa, Gordon: *See*—
Beran, Anthony V.; and Shigezawa, Gordon, 5,073,034, Cl. 374-183.000.
Shih, Jenn S.; Smith, Terry E.; and Chuang, Jui-Chang, to ISP Investments Inc. Strongly swellable, moderately crosslinked polyvinylpyrrolidone. 5,073,614, Cl. 526-258.000.
Shikamori, Tamotu: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.
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Shima, Hiroyuki: *See*—
Saito, Takayuki; Nakajima, Ken; Iwase, Yoki; Ikeda, Yukio; and Shima, Hiroyuki, 5,073,268, Cl. 210-638.000.
Shimada, Fumihiro; and Uemura, Hisashi, to Kanzaki Paper Mfg. Co., Ltd. Thermal head breakage detecting circuit. 5,073,786, Cl. 346-76.0PH.
Shimada, Makoto: *See*—
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Shimamura, Yasuo: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.

Shimano Industrial Co., Ltd.: *See*—
Nagano, Masashi, 5,073,151, Cl. 474-160.000.

Shimanuki, Masanobu, to Kabushiki Kaisha Toshiba. Cordless telephone system having an automatic answering device. 5,073,928, Cl. 379-70.000.

Shimaya, Kazuhiko, to Tsubakimoto Chain Co. Chain tensioner. 5,073,150, Cl. 474-110.000.

Shimizu, Mitsuru: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Shimizu, Mutsuo; Fukuoka, Hirofumi; and Fukuhira, Masanori, to Shin-Etsu Chemical Co., Ltd. Preparation of silicon nitride powder. 5,073,358, Cl. 423-344.000.

Shimura, Keiichi, to Sanden Corporation. Electromagnetic clutch. 5,072,817, Cl. 192-84.00C.

Shimura, Teruyuki, to Mitubishi Denki Kabushiki Kaisha. Heterojunction bipolar transistor. 5,073,812, Cl. 357-34.000.

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Konno, Hiroki; and Kishita, Hirofumi, 5,073,422, Cl. 428-40.000.
Shimizu, Mutsuo; Fukuoka, Hirofumi; and Fukuhira, Masanori, 5,073,358, Cl. 423-344.000.

Shin, Jung-Hyun: *See*—
Kwon, Oh-Hyun; Jang, Taek-Yong; Shin, Jung-Hyun; and Choi, Won-Taek, 5,073,510, Cl. 437-40.000.

Shin, Yong. Game ball having internal rotation imparting mechanism. 5,072,938, Cl. 273-58.00F.

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Tabata, Katsuhiro; Hayase, Masahiro; Asami, Hajime; Asakura, Hiroyuki; and Mitsui, Kenji, 5,073,689, Cl. 219-10.491.

Shindo, yoshiaki: *See*—
Ogawa, Keikitsu; Takeda Sunoa; Hyogo, Mitsushi; and Shindo, yoshiaki, 5,072,736, Cl. 128-680.000.

Shinko Electric Co., Ltd.: *See*—
Kanayama, Yutaka, 5,073,749, Cl. 318-587.000.

Shinn, Ronald R.: *See*—
Lowder, James E.; Shinn, Ronald R.; and Baker, John L., 5,072,588, Cl. 60-571.000.

Shiomi, Masao: *See*—
Toyonaga, Hajime; Nishida, Toshio; Takeishi, Yasuo; and Shiomi, Masao, 5,073,106, Cl. 431-285.000.

Shionogi & Co., Ltd.: *See*—
Hagishita, Sanji; and Seno, Kaoru, 5,073,648, Cl. 564-374.000.

Shiotsuki, Masao: *See*—
Miyao, Hidehiko; Shiotsuki, Masao; Kawamura, Shigeyoshi; and Komatsu, Fumiaki, 5,073,305, Cl. 252-633.000.

Shipley, Roch J.: *See*—
Moracz, Donald J.; and Shipley, Roch J., 5,072,871, Cl. 228-193.000.

Shirai, Kenji: *See*—
Saito, Shiro; Shirai, Kenji; Kawamoto, Ryuichi; and Sakakibara, Shigeru, 5,073,500, Cl. 436-53.000.

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Katsuta, Tsuyoshi; and Shiraishi, Yasuhito, 5,073,829, Cl. 358-498.000.

Shirakura, Akira; Tsuchiya, Takao; Watanabe, Haruo; and Kawasumi, Koichi, to Sony Corporation. Electronic photography apparatus. 5,073,798, Cl. 355-245.000.

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Shitamura, Osamu: *See*—
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Shizu, Harumi. CMOS inverter with noise reduction feedback means. 5,073,727, Cl. 307-451.000.

Shoemaker, Kenneth D., to Intel Corporation. Microprocessor bus interface unit which changes scheduled data transfer indications upon sensing change in enable signals before receiving ready signal. 5,073,969, Cl. 395-725.000.

Shoji, Mitsuyoshi: *See*—
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Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.

Shope, John L., Jr.: *See*—
Tienor, Lawrence J.; and Shope, John L., Jr., 5,072,664, Cl. 99-353.000.

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Shoup, Robert D.: *See*—
Foster, Gordon F.; Havewala, Noshir B.; and Shoup, Robert D., 5,073,181, Cl. 65-24.000.

Showa Aluminum Corporation: *See*—
Usui, Tadashi; and Kagoshige, Shinji, 5,072,789, Cl. 165-134.100.

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Shum, Victor K.: *See*—
Miller, Jeffrey T.; Modica, Frank S.; Cilluffo, Sandra L.; and Shum, Victor K., 5,073,529, Cl. 502-49.000.

Sieber, Alexander: *See*—
Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,073,579, Cl. 524-255.000.

Siegel, Kenneth P.; Parker, J. Bradford; and Wroclawski, John, to Cayman Systems, Inc. Network protocol translator including method and apparatus for reducing interprocess communication and data exchange overhead. 5,073,852, Cl. 395-700.000.

Siegel, Neal A.; Tripp, Edward S.; Aunet, Diane L.; and Georgevich, Gradimir G., to Abbott Laboratories. Method of ultrasonically cutting fibrous materials and device therefrom. 5,073,216, Cl. 156-73.300.

Sieksmeyer, Rolf; and Wittek, Jurgen, to Norddeutsche Seekabelwerke AG. Equipment for biological water treatment, in particular for denitrification of raw water to produce potable water. 5,073,256, Cl. 210-151.000.

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Boehm, Manfred, 5,073,748, Cl. 318-569.000.
Evers, Christian, 5,073,955, Cl. 382-21.000.
Granz, Bernd, 5,072,722, Cl. 128-24.0EL.
Hofmann, Ruediger, 5,073,775, Cl. 340-825.790.
Kruck, Thomas; Behrendorf, Norbert; and Faubel, Heiko, 5,073,645, Cl. 556-13.000.
Roehl, Siegfried; and Mathuni, Josef, 5,073,515, Cl. 437-52.000.
Trimborn, Peter, 5,073,089, Cl. 417-68.000.

Siemens Energy & Automation, Inc.: *See*—
Pipis, George C.; and Lambert, George L., III, 5,072,848, Cl. 220-241.000.

Sigmax Kabushiki Kaisha: *See*—
Watanabe, Masaharu, 5,073,952, Cl. 382-8.000.

Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., to Amoco Corporation. Preparation of a dimethyltetralin. 5,073,670, Cl. 585-320.000.

Siltech Inc.: *See*—
O'Lenick, Anthony J., Jr., 5,073,619, Cl. 528-26.000.

Simes Societa Italiana Medicinali e Sintetici S.p.A.: *See*—
Casagrande, Cesare; and Santangelo, Francesco, 5,073,547, Cl. 514-79.000.

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Draheim, Harvey J.; Charlson, Glenn T.; Beiswenger, John L.; and Brunner, Merlin A., 5,072,464, Cl. 5-93.100.

Simon Fraser University: *See*—
Morrison, S. Roy; and Miremadi, Bijan K., 5,072,886, Cl. 241-1.000.

Simon, Richard L.: *See*—
Lifer, Sherryl L.; Marshall, Winston S.; Mohamadi, Fariborz; Reel, Jon K.; Simon, Richard L.; Steinberg, Mitchell I.; and Whitesitt, Celia A., 5,073,566, Cl. 514-381.000.

Simone, John J. Air tube control for frozen dessert machine. 5,072,599, Cl. 62-308.000.

Simons, John R.; and Galaszewski, William, to Star Sprinkler Corporation. Concealed sprinkler head assembly. 5,072,792, Cl. 169-37.000.

Sindelar, Joseph L. Putter stabilizing and guiding system. 5,072,943, Cl. 273-192.000.

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Lawrie, George, 5,072,679, Cl. 112-443.000.

Singh, Bahadur: *See*—
Majumdar, Amalendu J.; and Singh, Bahadur, 5,073,197, Cl. 106-692.000.

Sippl, Fritz: *See*—
Gorike, Rudolf; Sippl, Fritz; and Szabo, Sandor, 5,073,936, Cl. 381-26.000.

Sirai, Akira; Yamamoto, Mitsuyosi; and Kurosawa, Haruo, to Hirose Electric Co., Ltd. Miniature electrical contact terminal. 5,073,128, Cl. 439-585.000.

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Stelk, John C., 5,072,888, Cl. 241-194.000.

Ski Technology Holdings, Inc.: *See*—
Dandy, Walter, III; and Nespor, Tony, 5,072,970, Cl. 280-811.000.

Skinner, David J.; and Zedalis, Michael S., to Allied-Signal Inc. Aluminum iron silicon based, elevated temperature, aluminum alloys. 5,073,215, Cl. 148-415.000.

Skogmo, David G., to Sandia Corporation. Beacon data acquisition and display system. 5,073,779, Cl. 342-37.000.

Slack, Victor: *See*—
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Slowinski, Christopher. Diamond setting. 5,072,601, Cl. 63-28.000.

Smarsly, Wilfried; and Track, Wolfgang, to MTU Motoren- und Turbinen-Union Munchen GmbH. Sintered light-weight structural material and method of its manufacture. 5,073,459, Cl. 428-550.000.

SMC Corporation: *See*—
Ishigaki, Tsuneo, 5,072,592, Cl. 62-55.500.

Smith, Barry W., to Fabri-Check, Inc. Article sorting system. 5,072,822, Cl. 198-349.000.

Smith, Christopher A.: *See*—
Dickie, Robert G.; and Smith, Christopher A., 5,072,868, Cl. 224-252.000.

Smith, Donald D.; and Winfrey, Betty J. Receptacle with improved features for facilitating separating of recyclable trash. 5,072,852, Cl. 220-404.000.

Smith Kline & French Laboratories, Ltd.: *See*—
Coates, William J., 5,073,559, Cl. 514-262.000.

Smith, LaVerne D.: *See*—
Schmidt, Rick A.; Smith, LaVerne D.; and VanRens, Russell J., 5,073,100, Cl. 425-192.00R.
Smith, Michael W.; and Pierce, Robert S., to Porex Technologies Corp. Diagnostic system employing a unitary substrate to immobilize microspheres. 5,073,344, Cl. 422-69.000.
Smith, R. Arnold, to McAdory, George D. Medicaments intended for combined use in the improvement of lymphocyte function to lower cholesterol levels. 5,073,555, Cl. 514-252.000.
Smith, Richard D.; Udseth, Harold R.; and Rockwood, Alan L., to Battelle Memorial Institute. Detection method for dissociation of multiple-charged ions. 5,073,713, Cl. 250-282.000.
Smith, Roger R. Drive extension. 5,072,633, Cl. 81-57.300.
Smith, Terry E.: *See*—
Shih, Jenn S.; Smith, Terry E.; and Chuang, Jui-Chang, 5,073,614, Cl. 526-258.000.
Snap-Tite, Inc.: *See*—
Wilcox, Wayne E., 5,072,755, Cl. 137-614.030.
Sneddon, Gordon R.: *See*—
Mollett, Christopher C.; and Sneddon, Gordon R., 5,073,234, Cl. 162-5.000.
Snyder, James P.: *See*—
Djuric, Stevan W.; Penning, Thomas D.; and Snyder, James P., 5,073,562, Cl. 514-365.000.
Societe Anonyme Dite Hispano Suiza: *See*—
Girard, Francis; Marceau, Christian J. A.; and Pouget, Jean-Pierre G., 5,072,548, Cl. 51-165.870.
Societe Civile d'Inventeurs SPML: *See*—
Melec, Didier; You, Claudine; Lefere, Genevieve; and Peres, Claudine, 5,073,441, Cl. 428-254.000.
Societe d'Applications Generales d'Electricite et de Mecanique Sagem: *See*—
Encaoua, Serge, 5,073,704, Cl. 250-201.100.
Societe Nationale des Poudres et Explosifs: *See*—
Lefumeux, Alain; and Raynal, Serge, 5,072,672, Cl. 102-435.000.
Societe Nationale d'Etude de Construction de Moteurs d'Aviation: *See*—
Guyon, Benoit P., 5,073,083, Cl. 415-115.000.
Soes, Lucas, to AMP Incorporated. Surface mount electrical connector. 5,073,119, Cl. 439-82.000.
Sogabe, Satoru: *See*—
Abe, Hiroomi; Nishio, Taichi; Mitsui, Kiyoshi; Sogabe, Satoru; and Sanada, Takashi, 5,073,590, Cl. 524-449.000.
Sogo Securities Co., Ltd.: *See*—
Kanayama, Yutaka, 5,073,749, Cl. 318-587.000.
Soled, Stuart L.: *See*—
Saleh, Ramzi Y.; Soled, Stuart L.; and Dispenziere, Nicholas C., 5,073,658, Cl. 585-530.000.
Solimar, Keith F., to Solimar Yachts. Manhole mounted filtering system for self-loading semi-trailer. 5,073,259, Cl. 210-232.000.
Solimar Yachts: *See*—
Solimar, Keith F., 5,073,259, Cl. 210-232.000.
Sollick, Jurgen: *See*—
Herwig, Wolfgang; Kleemann, Dittmar; Kroger, Uwe; Wurth, Hans; Mayer, Martin; Meyer, Franz-Josef; Rometsch, Werner; Schenkemeyer, Erhard; Schneider, Martin; Sollick, Jurgen; Kochendorfer, Lore; and Kochendorfer, Claus, 5,073,071, Cl. 411-353.000.
Somar Corporation: *See*—
Igari, Akihide; and Nakagawa, Zenbee, 5,073,302, Cl. 252-518.000.
Sonehara, Tomio; Aruga, Shuji; and Morozumi, Shinji, to Seiko Epson Corporation. Projection-type display device. 5,073,013, Cl. 359-63.000.
Sonner, David D.: *See*—
Edwards, Bryan T.; Flickinger, Steven L.; Kevern, James D.; Sonner, David D.; Weber, Robert N.; and Zeiders, Jeffrey A., 5,073,046, Cl. 385-90.000.
Sonoda, Rikuo: *See*—
Takagi, Kazuhiko; and Sonoda, Rikuo, 5,073,055, Cl. 400-578.000.
Sony Corporation: *See*—
Fujita, Koji, 5,073,463, Cl. 430-28.000.
Ito, Shinichi; Noshi, Naoya; and Okamoto, Yutaka, 5,073,514, Cl. 437-44.000.
Kobayashi, Yuhei, 5,073,884, Cl. 369-44.370.
Mitsumori, Koji, 5,073,883, Cl. 369-44.150.
Sano, Kohichi; and Hayashi, Toshitada, 5,073,835, Cl. 360-77.040.
Shirakura, Akira; Tsuchiya, Takao; Watanabe, Haruo; and Kawasumi, Koichi, 5,073,798, Cl. 355-245.000.
Ueki, Masaaki; Yasuda, Nobuyuki; and Masuda, Toshihiko, 5,073,778, Cl. 341-131.000.
Yamada, Yukio; Furukawa, Akio; and Isono, Kazuki, 5,073,823, Cl. 358-209.000.
Soofi, Madjid, to Magneco/Metrel, Inc. Tundish impact pad. 5,072,916, Cl. 266-275.000.
Sorenson, Joseph T.: *See*—
Wonder, Terry M.; Sorenson, Joseph T.; Hendry, Garlyn W.; and Neer, Lawrence A., 5,072,738, Cl. 128-888.000.
Sorex Medical, A Division of Sorenson Development, Inc.: *See*—
Wonder, Terry M.; Sorenson, Joseph T.; Hendry, Garlyn W.; and Neer, Lawrence A., 5,072,738, Cl. 128-888.000.
Sorkin, Felix L.; and Hayes, Norris O., to Varitech Industries, Inc. Post-tension anchor system. 5,072,558, Cl. 52-230.000.
South Texas Sports Manufacturing, Inc.: *See*—
Zarate, Rene A., 5,072,937, Cl. 273-26.00E.
Southern California Edison: *See*—
Kennedy, James T., 5,073,680, Cl. 174-40.0TD.
Southern Communications, Inc.: *See*—
Jenkins, Sandra D., 5,072,535, Cl. 40-564.000.
Spalt, Gregory P.; and Spalt, Taylor E. Ladder adaptable platform. 5,072,808, Cl. 182-103.000.
Spalt, Taylor E.: *See*—
Spalt, Gregory P.; and Spalt, Taylor E., 5,072,808, Cl. 182-103.000.
Sparvieri, Nicola; and Cattarin, Paolo, to Selenia Industrie Elettroniche Associate S.p.A. Process for manufacturing ceramic magnetic material. 5,073,359, Cl. 423-594.000.
Spater, Stuart S.: *See*—
Kolton, Chester; and Spater, Stuart S., 5,072,866, Cl. 223-91.000.
Spayer, James L.: *See*—
Peters, Richard K.; Elmerick, Donald V.; Spayer, James L.; and Walter, Gerald E., 5,073,857, Cl. 364-413.100.
Speck, Ulrich: *See*—
Blaszkiewicz, Peter; and Speck, Ulrich, 5,073,362, Cl. 424-5.000.
Spector, Avner; Rutiser, Sylvia; and Barnea, Daniel. Shock wave lithotripter and method for using the same. 5,072,733, Cl. 128-660.030.
Spector, George: *See*—
Newton, Maurice M.; and Spector, George, 5,072,695, Cl. 119-51.040.
Speit, Burkhard, to Schott Glaswerke. Radiation-shielding glasses providing safety against electrical discharge and being resistant to discoloration. 5,073,524, Cl. 501-60.000.
Sperko, Walter J., to Sterilizer Technologies Corporation. Sterilizer cart. 5,072,960, Cl. 280-47.340.
Spranger, Kurt: *See*—
Raff, Manfred; and Spranger, Kurt, 5,072,498, Cl. 29-163.800.
Spraying Systems Co.: *See*—
Vidusek, Daniel A., 5,072,883, Cl. 239-290.000.
Springett, Brian E.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.
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Sputhe, Alan C. Sealing apparatus for an internal combustion engine. 5,072,697, Cl. 123-41.690.
Spykerman, David J.; Marcusen, David P.; and Doenges, Scott W., to Prince Corporation. Pivoted arm cupholder. 5,072,989, Cl. 297-194.000.
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Hays, Eric L., 5,073,766, Cl. 336-217.000.
Squire, David C. Method and apparatus for passive refrigerant retrieval and storage. 5,072,594, Cl. 62-77.000.
Stabel, Uwe; Gosch, Hans-Juergen; Fischer, Rolf; Harder, Wolfgang; and Hechler, Claus, to BASF Aktiengesellschaft. Preparation of 1,4-butanediol. 5,073,650, Cl. 568-864.000.
Staehlin, John H.: *See*—
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Henne, John R., 5,072,974, Cl. 292-126.000.
Staplin, Deborah K.; Shen, Jian-Kuo; and Miu, Ming-Tzer, to Bull HN Information Systems Inc. Resource conflict detection method and apparatus included in a pipelined processing unit. 5,073,855, Cl. 395-375.000.
Star Sprinkler Corporation: *See*—
Simons, John R.; and Galaszewski, William, 5,072,792, Cl. 169-37.000.
Stark, Erwin: *See*—
Prantl, Bernhard; Walz, Rolf; and Stark, Erwin, 5,073,623, Cl. 530-210.000.
Starkey, Daniel C.: *See*—
Price, Macy J., Jr.; Johnson, Mack E.; and Starkey, Daniel C., 5,072,838, Cl. 211-162.000.
Stearns, Kenneth W.; and McGee, John K., to Stearns McGee Incorporated. Treadmill. 5,072,928, Cl. 272-69.000.
Stearns McGee Incorporated: *See*—
Stearns, Kenneth W.; and McGee, John K., 5,072,928, Cl. 272-69.000.
Steele, Charles E.: *See*—
Patillo, Ronald L.; and Steele, Charles E., 5,073,696, Cl. 219-233.000.
Steele, John W., to United Technologies Corporation. Method and apparatus for analyzing total organic halogens. 5,073,502, Cl. 436-125.000.
Steele, John W.: *See*—
Nalette, Timothy A.; and Steele, John W., 5,073,505, Cl. 436-178.000.
Steenrod, Wayne: *See*—
McCoy, John W.; and Steenrod, Wayne, 5,072,747, Cl. 134-48.000.
Steffen, Matthias; and Wente, Gerald, to Otis Elevator Company. Escalator handrail stop device. 5,072,820, Cl. 198-323.000.
Steigerwald, Robert L.; Koninsky, Peter M.; and Franz, Gerhard A., to General Electric Company. Power distribution system. 5,073,848, Cl. 363-65.000.
Steinberg, Howard N.: *See*—
Zeldis, Jerome B.; Gale, Robert P.; and Steinberg, Howard N., 5,073,481, Cl. 435-5.000.
Steinberg, Mitchell I.: *See*—
Lifer, Sherryl L.; Marshall, Winston S.; Mohamadi, Fariborz; Reel, Jon K.; Simon, Richard L.; Steinberg, Mitchell I.; and Whitesitt, Celia A., 5,073,566, Cl. 514-381.000.

Steinbrenner, Ulrich; Plapp, Gunther; and Wagner, Wolfgang, to Robert Bosch GmbH. Method and apparatus for setting a tank venting valve. 5,072,712, Cl. 123-489.000.

Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., to Process Bonding, Inc. Door panel. 5,073,429, Cl. 428-71.000.

Stelk, John C., to Sivyer Steel Corporation. Symmetrical protective cap for a rotary hammer assembly for a hammermill. 5,072,888, Cl. 241-194.000.

Stenglein, Paul R.; Farrell, Robert C.; and Derry, Michael A., to General Motors Corporation. Drive assembly for universal joint. 5,073,144, Cl. 464-111.000.

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Stenlund, Stig, 5,072,784, Cl. 165-47.000.

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Stephens, Frank A.; Hager, John P.; and Stephens, Frank M., Jr., to Iron Carbide Holdings, Limited. Process for controlling the product quality in the conversion of reactor feed into iron carbide. 5,073,194, Cl. 75-376.000.

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Stephens, Frank A.; Hager, John P.; and Stephens, Frank M., Jr., 5,073,194, Cl. 75-376.000.

Stephens, Robert W.: *See—*
Burgess, Roy T.; Gunda, Rajamouli; Herta, Frank; Hodges, Robert C.; Kessler, James A.; Leemhuis, Richard S.; McCarty, Michael R.; and Stephens, Robert W., 5,073,091, Cl. 60-222.00R.

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Stern, Peter: *See—*
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Stern & Stern Industries, Inc.: *See—*
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Sterzel, Hans-Josef, to BASF Aktiengesellschaft. Preparation of thermoplastic compositions filled with ceramic powders and oxidic sinter additives. 5,073,319, Cl. 264-101.000.

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Newlove, John C.; McDougall, Lee A.; Walker, John R.; and Stockwell, John R., 5,073,276, Cl. 252-8.551.

Stoffel, Nancy C.: *See—*
Farooq, Shaji; Natarajan, Govindarajan; Reddy, Srinivasa S. N.; Shelleman, Richard A.; Stoffel, Nancy C.; and Vallabhaneni, Rao V., 5,073,180, Cl. 65-18.400.

Stoll, John R.: *See—*
Kuyzin, Gregg S.; and Stoll, John R., 5,073,576, Cl. 521-99.000.

Story, Roderick B.: *See—*
Offers, Albert G.; White, Christopher D.; and Story, Roderick B., 5,073,923, Cl. 379-165.000.

Stott, Christopher; and Salt, Howard T., to LK Limited. Counterbalance control apparatus. 5,072,522, Cl. 33-503.000.

Straemke, Siegfried. Conductor passage at a vacuum container. 5,072,693, Cl. 118-715.000.

Straeter, Joseph G.: *See—*
Weder, Donald E.; Straeter, Joseph G.; and Craig, Frank J., 5,073,161, Cl. 493-154.000.

Strandberg, Charles F., Jr.; and Strandberg, Robert C. Apparatus for monitoring size encapsulation of yarn on a slasher. 5,072,691, Cl. 118-679.000.

Strandberg, Robert C.: *See—*
Strandberg, Charles F., Jr.; and Strandberg, Robert C., 5,072,691, Cl. 118-679.000.

Straubel, Max: *See—*
Eblen, Ewald; Hofmann, Karl; Schmitt, Alfred; Straubel, Max; and Truong-Canh, Hung, 5,072,706, Cl. 123-297.000.

Street, Leslie J.: *See—*
Baker, Raymond; Street, Leslie J.; and Saunders, John, 5,073,557, Cl. 514-254.000.

Streett, William B.: *See—*
Zemanian, Thomas S.; Gold, Thomas; Streett, William B.; and Zollweg, John A., 5,073,666, Cl. 585-734.000.

Strippit, Inc.: *See—*
Hill, Ronald C.; Eckert, Richard M.; and Marzullo, Anthony, 5,072,620, Cl. 72-414.000.

Strong, Michael R.: *See—*
Niemi, Randolph G.; and Strong, Michael R., 5,072,854, Cl. 222-1.000.

Studsvik AB: *See—*
Arvesen, Jan, 5,073,333, Cl. 376-310.000.

Stull, Gene. Push-to-open non-resealable cap construction. 5,072,863, Cl. 222-523.000.

Stultz, Timothy J., to Peak Systems, Inc. Method for selectively heating a film on a substrate. 5,073,698, Cl. 219-405.000.

Sturzebecher, Dana J.; and Paolella, Arthur, to United States of America, Army. Optical control of a microwave switch. 5,073,717, Cl. 250-551.000.

Subramanian, Malathy, to Colgate-Palmolive Company. Sanguinaria mouthrinse having improved anti microbial activity and stability. 5,073,368, Cl. 424-58.000.

Suda, Shigeyuki, to Canon Kabushiki Kaisha. Image deflecting device. 5,073,017, Cl. 359-557.000.

Sudo, Mitsuo: *See—*
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 5,072,823, Cl. 198-468.400.

Suemune, Toshiroh: *See—*
Itoh, Toshikazu; and Suemune, Toshiroh, 5,073,861, Cl. 364-550.000.

Suess, Hans U.; and Eul, Wilfried, to Degussa Aktiengesellschaft. Process for stabilization of the viscosity of wood pulps. 5,073,301, Cl. 252-402.000.

Suezaki, Yasunaga: *See—*
Asakawa, Yoshio; and Suezaki, Yasunaga, 5,072,840, Cl. 212-205.000.

Suga, Yoshinori; Tanaka, Eiji; Kato, Satoshi; and Sato, Kaoru, to Mitsubishi Kasei Corporation. Substrate of optical disc. 5,073,427, Cl. 428-64.000.

Sugimoto, Michio: *See—*
Katsuno, Hisashi; and Sugimoto, Michio, 5,073,652, Cl. 585-419.000.

Sugimoto, Tadahide: *See—*
Fujita, Minoru; Sugimoto, Tadahide; and Takagi, Yutaka, 5,073,787, Cl. 346-135.100.

Sugita, Yasutoshi: *See—*
Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 5,073,965, Cl. 382-47.000.

Sugiura, Masakazu: *See—*
Amano, Yoshiyuki; Kikutake, Jun-ichiro; and Sugiura, Masakazu, 5,073,485, Cl. 435-7.940.

Sugiura, Takashi; and Kurita, Mitsuru, to Canon Kabushiki Kaisha. Image processing apparatus with contour extraction. 5,073,959, Cl. 382-22.000.

Sugiyama, Tsukasa, to Mita Industrial Co., Ltd. Paper feeding control device. 5,072,924, Cl. 271-110.000.

Sugiyama, Tsukasa, to Mita Industrial Co., Ltd. Image forming apparatus capable of changing image forming modes during continuous image forming operation. 5,073,802, Cl. 355-313.000.

Suica, David E.; Kinne, Michael F.; and Williamson, Gary S., to Black Clawson Company, The. Screening apparatus for paper making stock. 5,072,834, Cl. 209-273.000.

Sulzer Brothers Limited: *See—*
Kaufman, Josef, 5,072,760, Cl. 139-452.000.

Sumi, Chen C.: *See—*
Chen, Chung-Ho; and Sumi, Chen C., 5,073,492, Cl. 435-240.200.

Sumitomo Chemical Company, Limited: *See—*
Abe, Hiroomi; Nishio, Taichi; Mitsui, Kiyoshi; Sogabe, Satoru; and Sanada, Takashi, 5,073,590, Cl. 524-449.000.
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

Sumitomo Electric Industries, Ltd.: *See—*
Yoshimura, Ichiro; Matsuda, Yasuo; and Chigusa, Yoshiki, 5,073,179, Cl. 65-2.000.

Sumitomo Metal Mining Co., Ltd.: *See—*
Matsumoto, Kazutoshi; Hyuga, Takehiro; and Mukai, Tetsuya, 5,073,528, Cl. 501-134.000.

Sumitomo Rubber Industries, Ltd.: *See—*
Nakahara, Akihiro; Yamada, Mikio; Ebisuno, Tadahiro; Sasaki, Takashi; and Oka, Kengo, 5,072,944, Cl. 273-220.000.
Oka, Kengo; and Yabuki, Yoshikazu, 5,072,945, Cl. 273-232.000.

Summers, Jeffrey L.: *See—*
Parekh, Ebrahim; Jensen, Jack E.; and Summers, Jeffrey L., 5,073,072, Cl. 411-354.000.

Sun-Maid Growers of California: *See—*
Bruno, Richard C.; Freeto, Teresa M.; and Garcia, Tony R., 5,073,400, Cl. 426-639.000.

Sun Microsystems, Inc.: *See—*
Rosenthal, David S. H., 5,073,933, Cl. 380-25.000.

Sun, Paul, to Giant Manufacturing Co., Ltd. Load applying device for an exercise bicycle. 5,072,930, Cl. 272-73.000.

Sun Refining and Marketing Company: *See—*
Durante, Vincent A.; and Lyons, James E., 5,073,664, Cl. 585-700.000.

Sun, Shao-Tang: *See—*
Shannon, Paul J.; Sun, Shao-Tang; and Swetlin, Brian J., 5,073,294, Cl. 252-299.010.

Sunclipse, Inc.: *See—*
Puett, Cecil E., 5,072,574, Cl. 53-427.000.

Sunderman, Wallace H.: *See—*
Jarabak, Andrew J.; Sunderman, Wallace H.; and Mendola, Edward G., 5,072,516, Cl. 29-609.000.

Sundstrand Corporation: *See—*
Shervington, Roger M., 5,073,039, Cl. 384-278.000.

Super Sagless Corporation: *See—*
Plunk, Jeffrey L., 5,072,988, Cl. 257-68.000.

Suto, Mark J., to Warner-Lambert Company. Process for the synthesis of novel and known nitroimidazoles which are useful as sensitizing agents. 5,073,639, Cl. 548-339.000.

Sutton, Loran W., to Thermo King Corporation. Apparatus for the automatic starting running, and stopping of an internal combustion engine. 5,072,703, Cl. 123-179.400.

Sutton, Robert F.; Scharrer, Joseph K.; and Beatty, Robert F., to Rockwell International Corporation. Hydrostatic bearing for axial/-radial support. 5,073,036, Cl. 384-107.000.

Suzuki, Akinobu; Sakazaki, Yuji; and Nakamura, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Optical semiconductor module. 5,073,047, Cl. 385-93.000.

Suzuki, Arata, to Capintec, Inc. Vest for use in an ambulatory physiological evaluation system including cardiac monitoring. 5,072,458, Cl. 2-102.000.

Suzuki, Horoyuki: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Suzuki, Kensuke; and Kohayakawa, Hiromasa, to Kabushiki Kaisha Toshiba. Cooling system for an apparatus with a heat generating element therein. 5,073,796, Cl. 355-215.000.

Suzuki, Nobumasa: *See*—
Hara, Yasushi; Suzuki, Nobumasa; Ito, Yukio; and Sekizawa, Kazuhiko, 5,073,649, Cl. 564-479.000.

Suzuki, Shoujyu; and Takasuga, Yutaka, to Bridgestone Corporation. Cylindrical member forming apparatus. 5,073,226, Cl. 156-417.000.

Suzuki, Syunsuke: *See*—
Kikuchi, Hiroyoshi; Kosuge, Hiroto; and Suzuki, Syunsuke, 5,073,693, Cl. 219-93.000.

Suzuki, Takahiro; and Aoki, Noboru, to NGK Spark Plug Co., Ltd. Igniter plug. 5,073,741, Cl. 313-138.000.

Suzuki, Takeshi; and Kabayama, Mineaki, to Tomita Pharmaceutical Co., Ltd. Boehmite-type aluminum hydroxide, process for preparing same and phosphate ion adsorbent containing same as effective component. 5,073,385, Cl. 424-630.000.

Suzuki, Tasuku: *See*—
Bizen, Kunio; Kashino, Minoru; Suzuki, Tasuku; Hasegawa, Ryuichi; and Hayashi, Koji, 5,073,316, Cl. 264-22.000.

Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, to ASCH Corporation. Picture communication apparatus. 5,073,926, Cl. 379-53.000.

Suzuki, Toshio: *See*—
Magara, Takuji; Iwasaki, Takeshi; Suzuki, Toshio; and Yamamoto, Masahiro, 5,073,691, Cl. 219-69.120.

Suzuki, Yasurou: *See*—
Sanada, Takashi; Kitadono, Kaoru; Suzuki, Yasurou; Nishio, Taichi; Abe, Hiroomi; and Kagawa, Noriyasu, 5,073,620, Cl. 525-68.000.

Suzuki, Yutaka, to Nissan Motor Co., Ltd. Ratio control for continuously variable transmission. 5,073,859, Cl. 364-424.100.

Svajda, Jindrich: *See*—
Habrovansky, Josef; Boltnar, Vincenc; Rybka, Jiri ; Korvas, Albin; and Svajda, Jindrich, 5,072,528, Cl. 36-43.000.

Swanson, Melvin J.; and Guire, Patrick E., to Bio-Metric Systems, Inc. Quantitative analysis apparatus and method. 5,073,484, Cl. 435-7.920.

Sweeten, Theodore P., to Ventures Unlimted Inc. Filter for lowering harmful crankcase emissions in an internal combustion engine. 5,072,713, Cl. 123-573.000.

Swetlin, Brian J.: *See*—
Shannon, Paul J.; Sun, Shao-Tang; and Swetlin, Brian J., 5,073,294, Cl. 252-299.010.

Swing Right Manufacturing Inc.: *See*—
Hurley, Dale P., 5,072,942, Cl. 273-191.00A.

Swinton, Randolph M. Protective panel for automotive vehicle. 5,072,979, Cl. 293-128.000.

Synaptics, Incorporated: *See*—
Mead, Carver A.; and Allen, Timothy P., 5,073,759, Cl. 330-288.000.

Synthes (U.S.A.): *See*—
Tessier, Jeff M.; and Brown, Woodward G., 5,073,694, Cl. 219-121.700.

Sypula, Donald S.: *See*—
Frank, John A.; Mammino, Joseph; Abramsohm, Dennis A.; Sypula, Donald S.; Chasko, Jerome P.; Gary, William L.; Nichol-Landry, Deborah J.; Schmidlin, Fred W.; Murti, Dasarao K.; and Springett, Brian E., 5,073,434, Cl. 428-195.000.

System Uniques Corporation: *See*—
Uematsu, Masahiro; Hiratsuka, Ryuichi; and Kato, Kazuro, 5,073,783, Cl. 342-359.000.

Systems Specialties: *See*—
Taube, Frank A., III, 5,072,881, Cl. 239-8.000.

Szabo, Gyorgy: *See*—
Busai, Gyula; Vegh, Gyorgyi; Losonczi, Zoltan; Ocsovai, Akos; Pozsonyi, Istvan; Szabo, Gyorgy; and Vajo, Gyorgy, 5,073,742, Cl. 313-318.000.

Szabo, Sandor: *See*—
Gorike, Rudolf; Sippl, Fritz; and Szabo, Sandor, 5,073,936, Cl. 381-26.000.

Szegda, Andrew, to John Mezzalingua Assoc. Inc. Coaxial cable end connector. 5,073,129, Cl. 439-585.000.

Tabak, Samuel A.: *See*—
Beech, James H., Jr.; Owen, Hartley; Ramage, Michael P.; and Tabak, Samuel A., 5,073,351, Cl. 422-190.000.

Tabata, Katsuhiro; Hayase, Masahiro; Asami, Hajime; Asakura, Hiroyuki; and Mitsui, Kenji, to Shinagawa Shirorenga Kabushiki Kaisha. Zirconia refractory heating element. 5,073,689, Cl. 219-10.491.

Tackle Tamer Products, Inc.: *See*—
Hendricks, William G.; and Eimer, Richard A., 5,072,538, Cl. 43-4.000.

Tada, Kaoru, to Minolta Camera Kabushiki Kaisha. Multiple unit image processing with a direct mode and multi-mode copying capacity. 5,073,868, Cl. 395-112.000.

Tadros, Gamil S.: *See*—
Dilger, Walter H.; Tadros, Gamil S.; Calder, David; and Giannelia, Paul B., 5,072,474, Cl. 14-1.000.

Taga, Kazuaki: *See*—
Takahashi, Masatoshi; Inaba, Hiroo; and Taga, Kazuaki, 5,073,406, Cl. 427-131.000.

Tagawa, Hisatoshi: *See*—
Matsumoto, Kazuaki; Omori, Toshimichi; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 5,073,211, Cl. 148-120.000.

Taguchi, Mituo: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Tai, Wu D.; Tzei, Chen Y.; and Jang, Shiau R. Remotely controlled gas cap assembly. 5,072,986, Cl. 296-97.220.

Takafuji, Yutaka; Inami, Takashi; and Atarashi, Hisashi, to Sharp Kabushiki Kaisha. Liquid crystal display device. 5,073,772, Cl. 340-784.000.

Takagi, Hiroshi: *See*—
Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, 5,073,523, Cl. 501-32.000.

Takagi, Kazuhiko; and Sonoda, Rikuo, to Brother Kogyo Kabushiki Kaisha. Sheet-feed/sheet-receiving unit used in combination with printer. 5,073,055, Cl. 400-578.000.

Takagi, Kunio, to Aisan Kogyo Kabushiki Kaisha. Stepping motor having a molded housing. 5,073,735, Cl. 310-71.000.

Takagi, Masaaki; Nakamura, Shigekazu; and Omura, Atsushi, to Copal Company Limited. Optical displacement detector including a displacement member's surface having a diffractive pattern and a holographic lens pattern. 5,073,710, Cl. 250-231.140.

Takagi, Nobukazu; and Seto, Takeshi, to Diesel KiKi Co., Ltd.; and Seiko Epson Corporation. Scroll-type fluid handling machine. 5,073,093, Cl. 417-410.000.

Takagi, Osamu; Azuma, Kishiro; and Iwamura, Tatsuichi, to Toagosei Chemical Industry, Co., Ltd. Process for producing hydroxylapatites. 5,073,357, Cl. 423-308.000.

Takagi, Yuji; Satoh, Isao; Ichinose, Makoto; Fukushima, Yoshihisa; and Kuroki, Yuzuru, to Matsushita Electric Industrial Co., Ltd. Optical disk recording and reading system with directory data access mechanism. 5,073,887, Cl. 369-100.000.

Takagi, Yutaka: *See*—
Fujita, Minoru; Sugimoto, Tadahide; and Takagi, Yutaka, 5,073,787, Cl. 346-135.100.

Takahashi, Kenichi: *See*—
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 5,073,925, Cl. 380-3.000.

Takahashi, Masatoshi; Inaba, Hiroo; and Taga, Kazuaki, to Fuji Photo Film Co., Ltd. Method of producing a magnetic recording medium. 5,073,406, Cl. 427-131.000.

Takahashi, Mitsugu; Kobayashi, Yoshiaki; Mitsuhashi, Takao; and Yamagata, Shinji, to Mitsubishi Denki Kabushiki Kaisha. Current limiting apparatus. 5,073,764, Cl. 335-16.000.

Takahashi, Yasufumi: *See*—
Nakamura, Shigeki; and Takahashi, Yasufumi, 5,073,904, Cl. 375-94.000.

Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Transfer method and device and driving system therefor for transfer presses. 5,072,823, Cl. 198-468.400.

Takahashi, Yoshitaka; Koide, Hiroshi; Gotoh, Hiroshi; Emoto, Masami; and Honda, Syuichi, to Ricoh Company, Ltd. Optical pickup device. 5,073,888, Cl. 369-112.000.

Takai, Kiichiro; and Sano, Haruo, to Aichi Kikai Kogyo Kabushiki Kaisha. Split thrust bearing for outboard engine. 5,072,707, Cl. 123-311.000.

Takanashi, Katsuya: *See*—
Satta, Masayuki; Takanashi, Katsuya; and Yanagi, Kunihiro, 5,073,771, Cl. 340-721.000.

Takano, Hiroshi; Masuda, Takashi; Kanaoka, Tomizo; Akao, Hideyuki; Hioki, Katsuyuki; and Aragane, Toshiaki, to Mitsuboshi Belting, Ltd. Belt-type continuously variable transmission with variable-speed pulley mechanism. 5,073,147, Cl. 474-28.000.

Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, to Sharp Corporation. Optical harmonic generator. 5,073,725, Cl. 307-427.000.

Takasuga, Yutaka: *See*—
Suzuki, Shoujyu; and Takasuga, Yutaka, 5,073,226, Cl. 156-417.000.

Takata Corporation: *See*—
Hamaue, Tetsuya, 5,072,968, Cl. 280-806.000.
Kamiyama, Misao, 5,072,969, Cl. 280-808.000.

Takayama, Satoshi: *See*—
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Takeda, Katsuhiko: *See*—
Fujiwara, Takao; and Takeda, Katsuhiko, 5,073,793, Cl. 355-202.000.

Takeda, Masahiro; and Uchida, Satoshi, to Kabushiki Kaisha Toshiba. Personal verification apparatus. 5,073,949, Cl. 382-2.000.

Takeda Sunoa: *See—*
Ogawa, Keikitsu; Takeda Sunoa; Hyogo, Mitsushi; and Shindo, yoshiaki, 5,072,736, Cl. 128-680.000.

Takeda, Yoshiaki: *See—*
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Takeishi, Yasuo: *See—*
Toyonaga, Hajime; Nishida, Toshio; Takeishi, Yasuo; and Shiomi, Masao, 5,073,106, Cl. 431-285.000.

Takeo, Hideya, to Fuji Photo Film Co., Ltd. Method for judging the correctness or incorrectness of a detected subdivision pattern of radiation images. 5,073,961, Cl. 382-27.000.

Takeshita, Junichiro: *See—*
Tohge, Kazuyoshi; and Takeshita, Junichiro, 5,073,722, Cl. 307-10.100.

Takeuchi, Akihiro: *See—*
Muraji, Tsutomu; Takeuchi, Akihiro; and Ochi, Atsuo, 5,073,826, Cl. 358-335.000.

Takeuchi, Hiroshi; and Mizuguchi, Kimio, to Kabushiki Kaisha Daikin Seisakusho. Air feeder for a pull type clutch assembly. 5,072,816, Cl. 192-70.120.

Takeuchi, Keiji: *See—*
Arima, Masatoshi; Nishizawa, Hiroaki; Takeuchi, Keiji; Deura, Hiroshi; and Ishida, Keiichiro, 5,073,545, Cl. 514-27.000.

Takeuchi, Nobuyuki: *See—*
Iida, Yasunobu; Takeuchi, Nobuyuki; Nakamura, Masato; Furuya, Koichi; Nakashima, Hiroshi; and Itoh, Toshiaki, 5,073,451, Cl. 428-336.000.

Takeuchi, Yasuhito, to Yokogawa Medical Systems, Limited. Pulse doppler MTI system. 5,072,734, Cl. 128-660.050.

Takewa, Hiroyuki: *See—*
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Takeyasu, Hiromitu: *See—*
Miura, Ryuichi; Moriwaki, Ken; Takeyasu, Hiromitu; Washita, Hiroshi; and Miyazaki, Nobuyuki, 5,073,613, Cl. 526-255.000.

Tamahashi, Kunihiro: *See—*
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.

Tamura, Tomoyuki: *See—*
Imataki, Hiroyuki; Hiraoka, Mizuho; Tamura, Tomoyuki; and Satoh, Tetsuya, 5,073,101, Cl. 425-385.000.

Tan, Ewe-Hong: *See—*
Deschler, Ulrich; Kleinschmit, Peter; Wolff, Siegfried; and Tan, Ewe-Hong, 5,073,644, Cl. 556-482.000.

Tanaka, Atsushi: *See—*
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Taniishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Tanaka, Eiji: *See—*
Suga, Yoshinori; Tanaka, Eiji; Kato, Satoshi; and Sato, Kaoru, 5,073,427, Cl. 428-64.000.

Tanaka, Kanou: *See—*
Konishi, Motofumi; Ando, Yoshio; Iwaya, Toshio; Tanaka, Kanou; Kotera, Masahide; Hashimoto, Norio; Sugita, Yasutoshi; Sano, Yoshitaka; and Ono, Satoshi, 5,073,965, Cl. 382-47.000.

Tanaka Kikinzoku Kogyo K.K.: *See—*
Sasaki, Noboru; and Ueyama, Masayuki, 5,072,521, Cl. 29-879.000.

Tanaka, Kouichi: *See—*
Hirota, Tatsuya; Fujikawa, Kiyokazu; Aoki, Yoshiaki; Kawamura, Tamotsu; Kawamura, Yozo; Tanaka, Kouichi; and Hamano, Takafumi, 5,072,526, Cl. 34-60.000.

Tanaka, Toshihiro: *See—*
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.

Tanaka, Tsuneo: *See—*
Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Tang, Ching W.: *See—*
Scozzafava, Michael; Tang, Ching W.; and Littman, Jon E., 5,073,446, Cl. 428-323.000.

Tang, Yeong Y. Direct current motor having a retaining device for holding magnets. 5,073,738, Cl. 310-91.000.

Taniishi, Shinnosuke: *See—*
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Taniishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Tannehill, John B.: *See—*
Tannehill, John M.; and Tannehill, John B., 5,072,956, Cl. 280-33.992.

Tannehill, John M.; and Tannehill, John B. Powered display for shopping cart. 5,072,956, Cl. 280-33.992.

Tanno, Masaya; and Onaya, Masato, to Sanyo Electric Co., Ltd. Delay circuit with muting to prevent noise due to random data at output. 5,073,733, Cl. 307-590.000.

Tapp, William T.: *See—*
Antonacci, Paul N.; Eaton, Geraldine M.; Morris, Delores R.; and Tapp, William T., 5,073,436, Cl. 428-219.000.

Taratuta, Victor G.; Thurston, George M.; and Benedek, George B., to Massachusetts Institute of Technology. Apparatus for detecting cataractogenesis using quasielastic light scattering. 5,072,731, Cl. 128-633.000.

Tarr, Robert E.; Burkes, Alice L.; and Mills, Susie H., to Procter & Gamble Company. Method for preparation of ultrafine citrus fiber and derivative fiber-enriched citrus beverages. 5,073,397, Cl. 426-599.000.

Tate, Edward O., Jr.: *See—*
Lancelot, Charles J.; Shaw, Anthony F.; and Tate, Edward O., Jr., 5,073,428, Cl. 428-67.000.

Tatsuta, Hideaki: *See—*
Nose, Katsuhiko; Kuze, Katsuaki; and Tatsuta, Hideaki, 5,073,455, Cl. 428-411.100.

Taube, Frank A., III, to Systems Specialties. Method of cleaning automated paint spraying equipment. 5,072,881, Cl. 239-8.000.

Tauchi, Hitoshi: *See—*
Nakano, Toshihiro; and Tauchi, Hitoshi, 5,072,844, Cl. 215-230.000.

Taue, Jun; and Yoshida, Takeo, to Yamaha Hatsudoki Kabushiki Kaisha, Yamaha Motor Co., Ltd. High pressure fuel injection device for engine. 5,072,882, Cl. 239-88.000.

Tayama, Yukiharu: *See—*
Hashiguchi, Osamu; Tayama, Yukiharu; and Yamamura, Shigeharu, 5,073,125, Cl. 439-310.000.

Taylor, Carl A.; and Hrncir, Robert E., to Rochester Gauges, Inc. Adjustable LPG gauge. 5,072,618, Cl. 73-317.000.

Taylor, Dale F., to General Electric Company. Corrosion resistant zirconium alloys containing copper, nickel and iron. 5,073,336, Cl. 376-457.000.

Taylor, John E.; Bogden, Arthur E.; Moreau, Jacques-Pierre; and Coy, David H., to Administrators of the Tulane Educational Fund; and Biomeasure, Inc. Treatment of small cell lung cancer with somatostatin analogs. 5,073,541, Cl. 514-9.000.

Taylor, Kevin D. Artists' brush holder. 5,072,904, Cl. 248-110.000.

Taylor, Stephen C., to Imperial Chemical Industries PLC. Cyclicdihydroxy compounds. 5,073,640, Cl. 560-254.000.

Taylor, Thomas A.; and Tucker, Robert C., Jr., to Union Carbide Coatings Service Technology Corporation. Apparatus for coating an iron based metal with a liquid protective metal and method. 5,073,415, Cl. 427-433.000.

Taylor, Thomas A., to Technology Corporation. Thermal barrier coating for substrates and process for producing it. 5,073,433, Cl. 428-134.000.

Techco Corporation: *See—*
Phillips, Edward H., 5,072,650, Cl. 91-375.00A.

Technicon Instruments Corporation: *See—*
Chapoteau, Eddy; Czech, Bronislaw P.; Gebauer, Carl R.; Leong, Koon-Wah; and Kumar, Anand, 5,073,501, Cl. 436-74.000.

Technology Corporation: *See—*
Taylor, Thomas A., 5,073,433, Cl. 428-134.000.

Tecle, Haile: *See—*
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 5,073,561, Cl. 514-357.000.

Teitman, Gerald J.: *See—*
Herbst, Joseph A.; Markham, Catherine L.; Sapre, Ajit V.; and Teitman, Gerald J., 5,073,349, Cl. 422-144.000.

Tektronix, Inc.: *See—*
Gumm, Linley F.; and Benedict, William, 5,073,822, Cl. 358-139.000.

Teleflex Incorporated: *See—*
Moore, Bruce H., 5,072,759, Cl. 138-153.000.

Temburg, Josef: *See—*
Leifeld, Ferdinand; and Temburg, Josef, 5,072,490, Cl. 19-80.00R.

Temmann, Robert: *See—*
Bichel, Joachim; and Temmann, Robert, 5,072,509, Cl. 29-892.300.

Tenconi, Riccardo, to Mec-Mor S.r.l. Knitting machine with needle control device for the knitting of pattern stitches. 5,072,603, Cl. 66-222.000.

Tendler, Robert K.; and Karkota, Frank P., Jr. Modular communications system including a portable unit range extender and selective-call system. 5,073,972, Cl. 455-35.000.

Teradyne, Inc.: *See—*
Hagensick, Thomas E., 5,073,919, Cl. 379-29.000.

Terao, Motoyasu: *See—*
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto; Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Terashita, Takaaki; and Okada, Setsuo, to Fuji Photo Film Co., Ltd. Multicolor interference filters with side surfaces to prevent entry of undesirable light. 5,073,008, Cl. 359-589.000.

Terratech Mining Services (PTY) Ltd.: *See—*
Hinks, Raymond W., 5,072,951, Cl. 277-40.000.

Terrill, Lawrence; and Carr, Francis L., to Safco Corporation. Noise immune power switch for automotive accessories. 5,073,721, Cl. 307-10.700.

Tesa S.A.: *See—*
Zanier, Adriano; and Lendi, Jurg, 5,072,524, Cl. 33-558.000.

Teschendorf, Hans-Juergen: *See*—
Frickel, Fritz-Frieder; Kuekenhoehner, Thomas; Rendenbach-Mueller, Beatrice; Weifenbach, Harald; and Teschendorf, Hans-Juergen, 5,073,563, Cl. 514-365.000.

Tessier, Jeff M.; and Brown, Woodward G., to Synthes (U.S.A.). Method and apparatus for laser cutting a hollow metal workpiece. 5,073,694, Cl. 219-121.700.

Tetherton, Cyril F., to Cubic Automatic Revenue Collection Group. Turnstile mechanism. 5,072,543, Cl. 49-47.000.

Teutsch, Erich O.: *See*—
Avakian, Roger W.; Parekh, Shashi L.; Shenian, Popkin; and Teutsch, Erich O., 5,073,416, Cl. 428-2.000.

Texacone Company: *See*—
Wheeler, John H., 5,073,321, Cl. 264-102.000.

Texas Instruments Deutschland GmbH: *See*—
Stickelbrocks, Karl, 5,073,781, Cl. 342-51.000.

Texas Instruments Incorporated: *See*—
Fukuhara, Kohji; and Yamasaki, Yoshio, 5,073,777, Cl. 341-131.000.
Malhi, Satwinder; Kwon, Oh K.; and Mahant-Shetti, Shivaling S., 5,073,117, Cl. 439-71.000.
Moslehi, Mehrdad M., 5,073,516, Cl. 437-89.000.
Ovens, Kevin M., 5,073,728, Cl. 307-455.000.
Rodder, Mark S., 5,073,519, Cl. 437-180.000.

Thacker, Susan A.: *See*—
Dubler, Robert E.; Thacker, Susan A.; Walling, John A.; and Wang, Nai-Yi, 5,073,629, Cl. 530-405.000.

Thamm, Horst-Dieter: *See*—
Wojtech, Bernhard; Niederstaetter, Walter; and Thamm, Horst-Dieter, 5,073,622, Cl. 528-486.000.

Theis, Erwin C. Garbage storage system and method. 5,072,810, Cl. 187-27.000.

Theis, Jurgen: *See*—
Coutandin, Jochen; Groh, Werner; Herbrechtsmeier, Peter; and Theis, Jurgen, 5,073,314, Cl. 264-1.500.

Theoretical Optics, Inc.: *See*—
Tovi, Murray, 5,073,009, Cl. 359-601.000.

Thermo King Corporation: *See*—
Sutton, Loran W., 5,072,703, Cl. 123-179.400.

Thiel, Ronald V., to Apple Computer, Inc. Apparatus and method for automatic registration of manually inserted print media. 5,072,925, Cl. 271-227.000.

Thom, Kelsey C., Jr., to California Pellet Mill Company. Roll mill. 5,072,887, Cl. 241-37.000.

Thomas, James A., Sr., to Purolator Product Company. Whisper quiet electromagnetic fluid pump. 5,073,095, Cl. 417-417.000.

Thomas, Jess B., Jr., to California Institute of Technology. Digital phase-lock loop. 5,073,907, Cl. 375-120.000.

Thompson, David A.: *See*—
Best, John S.; Hetzler, Steven R.; Kabelac, William J.; and Thompson, David A., 5,073,834, Cl. 360-77.080.

Thompson, Richard W.: *See*—
Johnson, Ronald E.; Thompson, Richard W.; and Wu, Lung-Ming, 5,073,423, Cl. 428-40.000.

Thompson, William L., to International Composites Corporation. Method for axially mounting and dismounting rigid sleeves onto, and from, cylinders. 5,072,504, Cl. 29-426.600.

Thompson, Winnie C.: *See*—
Gunasekera, Sarath P.; Faircloth, Glynn T.; Wright, Amy E.; Thompson, Winnie C.; and Burres, Neal, 5,073,572, Cl. 514-739.000.

Thomson Composants Militaires et Spatiaux: *See*—
Cazaux, Yvon, 5,073,908, Cl. 377-62.000.

Thomson, Robert T.: *See*—
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, 5,073,665, Cl. 585-722.000.

Thornton, Peter B.; Cone, Stanley H.; and Booz, George W., to Stern & Stern Industries, Inc. Low permeability fabric, airbag made of same and method of making same. 5,073,418, Cl. 428-34.900.

Thrift, Jimmie R.; and Hendley, Nass. Railway freight car coupler lift. 5,072,914, Cl. 254-100.000.

Thurston, George M.: *See*—
Taratuta, Victor G.; Thurston, George M.; and Benedek, George B., 5,072,731, Cl. 128-633.000.

Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, to Hitachi, Ltd. Full-automated washer. 5,072,473, Cl. 8-159.000.

Tidman, Derek A.: *See*—
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Massey, Dennis W.; and Greig, Joseph R., 5,072,647, Cl. 89-8.000.

Tienor, Lawrence J.; and Shope, John L., Jr., to National Presto Industries, Inc. Shell maker apparatus. 5,072,664, Cl. 99-353.000.

Tinet, Daniel: *See*—
Kairy, Mostafa; Tinet, Daniel; and Van Damme, Henri, 5,073,360, Cl. 423-608.000.

Tire Service Equipment Mfg. Co., Inc.: *See*—
Ochoa, Sandy, 5,072,764, Cl. 157-1.100.

Tischer, Werner, to Zahnradfabrik Friedrichshafen, AG. Control mechanism for two hydraulic adjustment devices supplied via one, each, current branch by a high-pressure pump. 5,072,802, Cl. 180-132.000.

Tisma Machine Corporation: *See*—
Tisma, Stevan, 5,072,573, Cl. 53-252.000.

Tisma, Stevan, to Tisma Machine Corporation. Apparatus with adjustable width trays for automatic packaging machines. 5,072,573, Cl. 53-252.000.

Titan Linkabit Corporation: *See*—
Bjerede, Bjorn E., 5,073,869, Cl. 364-718.000.

Tkachenko, ALexandr Y.: *See*—
Gorbunov, Valery F.; Eller, ALexandr F.; Tkachenko, ALexandr Y.; Axenov, Vladimir V.; and Nagorny, Vladimir D., 5,072,992, Cl. 299-33.000.

TOA Medical Electronics Co. Ltd.: *See*—
Hukuhara, Takahito; and Yabuta, Teiichi, 5,073,343, Cl. 422-67.000.

Toagosei Chemical Industry Co., Ltd.: *See*—
Iinuma, Tomohisa; Yamamoto, Noriyuki; and Kato, Hideki, 5,073,580, Cl. 523-442.000.
Takagi, Osamu; Azuma, Kishiro; and Iwamura, Tatsuichi, 5,073,357, Cl. 423-308.000.

Tobikawa, Tetsuo: *See*—
Naka, Hiromasa; Nakamura, Norio; Okushima, Takehiko; Okumura, Takao; Shoji, Tatsuo; and Tobikawa, Tetsuo, 5,072,557, Cl. 52-126.600.

Tobita, Hideyuki: *See*—
Thuruta, Sizuo; Takeda, Yoshiaki; Hiyama, Isao; Kubo, Kenichi; Ohonishi, Toshikazu; Tobita, Hideyuki; Shikamori, Tamotu; Ohsugi, Hiroshi; Kinoshita, Hiroshi; Ikeda, Kazufumi; Ohwa, Yoshio; Hori, Toshiyuki; Hirayama, Masayoshi; and Honma, Takeo, 5,072,473, Cl. 8-159.000.

Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, to Bristol-Myers Squibb Company. BU-4164E - A and B, prolyl endopeptidase inhibitors and their methods of use. 5,073,549, Cl. 514-183.000.

Todd, Paul H., Jr., to Kalamazoo Holdings, Inc. Beer flavored with a non-acidic hop-flavor fraction. 5,073,396, Cl. 426-592.000.

Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle engine output control apparatus. 5,073,865, Cl. 364-431.050.

Tohda, Isao: *See*—
Fujihira, Shinji; Yanagidani, Yuko; Tohda, Isao; and Kanbara, Shinji, 5,072,698, Cl. 123-52.0MB.

Tohge, Kazuyoshi; and Takeshita, Junichiro, to Jidosha Denki Kogyo K.K. Apparatus and method for cleaning a headlamp and actuating a windshield wiper. 5,073,722, Cl. 307-10.100.

Tohyo Porimah Kabushikigaisha: *See*—
Midorikawa, Yoshio, 5,073,220, Cl. 156-244.110.

Tokico Ltd.: *See*—
Imaizumi, Tomio, 5,072,812, Cl. 188-282.000.

Tokumaru, Terutaka: *See*—
Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, 5,073,725, Cl. 307-427.000.

Tokyo Electric Co., Ltd.: *See*—
Kashiwagi, Shinichi, 5,073,053, Cl. 400-240.300.
Yamaguchi, Yasuyoshi; and Matsuda, Susumu, 5,073,800, Cl. 355-297.000.

Tomita, Koji: *See*—
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 5,073,549, Cl. 514-183.000.

Tomita Pharmaceutical Co., Ltd.: *See*—
Suzuki, Takeshi; and Kabayama, Mineaki, 5,073,385, Cl. 424-630.000.

Tomono, Fumio: *See*—
Ishikawa, Yasushi; Tomono, Fumio; and Fujita, Tetsuya, 5,072,690, Cl. 118-658.000.

Tonks, Gregory V.; and Verstappen Declercq, Anne E. L. M. M., to Shell Oil Company. Process for the isomerization of a hydrocarbon feed. 5,073,667, Cl. 585-738.000.

Tonomura, Masashi: *See*—
Suzuki, Toshio; Sahara, Hiroshi; Tonomura, Masashi; Murata, Yoshihiro; Fujisaki, Naoki; Hattori, Seiji; and Kimura, Hiroshige, 5,073,926, Cl. 379-53.000.

Toray Industries, Inc.: *See*—
Satou, Junya; Murakami, Masatsugi; and Sasaki, Kikuji, 5,073,452, Cl. 428-349.000.

Toray Silicone Company, Ltd.: *See*—
Ona, Isao; Ozaki, Masaru; and Kurusu, Hidetoshi, 5,073,275, Cl. 252-8.600.

Torazzina, Aldo: *See*—
Botti, Edoardo; and Torazzina, Aldo, 5,073,811, Cl. 357-34.000.

Torres, Antonio: *See*—
Jorge, Edward M.; Torres, Antonio; and Lund, Monty M., deceased, 5,073,617, Cl. 526-343.000.

Toshiba Lighting and Technology Group: *See*—
Kakitani, Tsutomu, 5,073,745, Cl. 315-307.000.

Tosini, Riccardo; and Bassarutti, Alfredo, to Danieli & C. Officine Meccaniche SpA. Continuous casting machine of a reduced height with immersed teeming nozzle. 5,072,779, Cl. 164-415.000.

Tosoh Corporation: *See*—
Hara, Yasushi; Suzuki, Nobumasa; Ito, Yukio; and Sekizawa, Kazuhiko, 5,073,649, Cl. 564-479.000.

Tovi, Murray, to Theoretical Optics, Inc. Laminated beam splitting optical system with reflective medium. 5,073,009, Cl. 359-601.000.

Townsend, Harold E., to General Electric Company. BWR turbopump recirculation system. 5,073,335, Cl. 376-373.000.

Toxoric, Inc.: *See*—
Sappington, Donald R., 5,072,716, Cl. 124-87.000.

Toy, Raymond L.: *See*—
Zinser, Richard L.; Koch, Steven R.; and Toy, Raymond L., 5,073,940, Cl. 381-47.000.

Toyo Boseki Kabushiki Kaisha: *See*—
Nose, Katsuhiko; Kuze, Katsuaki; and Tatsuta, Hideaki, 5,073,455, Cl. 428-411.100.

Toyo Seikan Kaisha Ltd.: *See*—
Imazu, Katsuhiro; Aizawa, Masanori; Miyazawa, Tetsuo; Satoh, Nobuyuki; and Kobayashi, Seishichi, 5,072,605, Cl. 72-46.000.

Toyoda Gosei Co., Ltd.: *See*—
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Uemura, Toshiya, 5,073,011, Cl. 359-265.000.
Nozaki, Masahiro, 5,072,545, Cl. 49-488.000.
Ogawa, Kazuo, 5,072,546, Cl. 49-491.000.

Toyonaga, Hajime; Nishida, Toshio; Takeishi, Yasuo; and Shiomi, Masao, to Osaka Gas Co., Ltd. Gas burner. 5,073,106, Cl. 431-285.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Mizuno, Hirohide; Koide, Shinichi; Nomura, Manabu; Kawamura, Nobuya; Nishio, Takeyoshi; and Nomura, Takao, 5,073,447, Cl. 428-327.000.
Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, 5,072,813, Cl. 188-322.150.

Track, Wolfgang: *See*—
Smarsly, Wilfried; and Track, Wolfgang, 5,073,459, Cl. 428-550.000.

Trahan, Robert L., to Globe Manufacturing Company. Garments with appendage portions having extensible flexible joints. 5,072,454, Cl. 2-70.000.

Tran, Chuong B.: *See*—
Chakravarty, Abhijit J. M.; Cooper, Steven R.; Ho, John K. H.; and Tran, Chuong B., 5,072,893, Cl. 244-76.00R.

Trans-Atlantic Company: *See*—
Millman, Norman A.; and Korban, Fouad F., 5,072,977, Cl. 292-336.300.

Trego, Brian R.: *See*—
Berthet, Michelle M. N. C.; Trego, Brian R.; and Wessely, Hans-Juergen, 5,073,586, Cl. 524-159.000.

Trichromatic Carpet Inc.: *See*—
Knowlton, Barry R.; and Elgarhy, Yassin, 5,073,442, Cl. 428-267.000.

Trico Products Corporation: *See*—
Pethers, Peter C., 5,073,060, Cl. 403-405.100.

Trimborn, Peter, to Siemens Aktiengesellschaft. Liquid-ring compressor. 5,073,089, Cl. 417-68.000.

Tripp, Edward S.: *See*—
Siegel, Neal A.; Tripp, Edward S.; Aunet, Diane L.; and Georgevich, Gradimir G., 5,073,216, Cl. 156-73.300.

Trokhan, Paul D., to Procter & Gamble Company, The. Process for chemically treating papermaking belts. 5,073,235, Cl. 162-199.000.

Trotta, Frank; and Gray, Gary, to Electronic Voting Systems, Inc. Voting booth. 5,072,999, Cl. 312-249.000.

Truchet, Jean-Marc: *See*—
Bozetto, Pierre; Truchet, Jean-Marc; Barret, Marcel; and Guy, Chauvier, 5,072,553, Cl. 52-63.000.

Trunzo, Angelo J.: *See*—
Hammond, John A.; and Trunzo, Angelo J., 5,073,183, Cl. 65-335.000.

Truong-Canh, Hung: *See*—
Eblen, Ewald; Hofmann, Karl; Schmitt, Alfred; Straubel, Max; and Truong-Canh, Hung, 5,072,706, Cl. 123-297.000.

Trutzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand; and Temburg, Josef, 5,072,490, Cl. 19-80.00R.

TRW Daut & Rietz GmbH & Co. KG: *See*—
Nottrott, Rudolf, 5,073,132, Cl. 439-884.000.

TRW Vehicle Safety Systems Inc.: *See*—
Blackburn, Brian K.; Gentry, Scott B.; and Mazur, Joseph F., 5,073,860, Cl. 364-424.050.
Gupta, Raj K.; Kraft, Morton L.; and Coleman, William B., 5,073,273, Cl. 210-760.000.

Tsaur, Sheng-Liang, to S. C. Johnson & Son, Inc. Polymeric thickeners and methods of producing the same. 5,073,591, Cl. 524-460.000.

Tseng, Chuen-Ing J., to Lonza Inc. Mono-iodopropargyl esters of dicarboxylic anhydrides and their use as antimicrobial agents. 5,073,570, Cl. 514-533.000.

Tsiang, Raymond C., to Shell Oil Company. Removal of group VIII metal catalyst from polymer cements by extraction with aqueous dicarboxylic acid. 5,073,621, Cl. 528-483.000.

Tsubaki, Atsushi: *See*—
Kamijo, Tetsuhide; Ujiie, Arao; Tsutsumi, Naoyuki; and Tsubaki, Atsushi, 5,073,553, Cl. 514-232.800.

Tsubakimoto Chain Co.: *See*—
Maruyama, Masao; Kozakura, Nobuto; Nakakubo, Katsuya; and Okamoto, Nobuo, 5,073,149, Cl. 474-104.000.
Shimaya, Kazuhiko, 5,073,150, Cl. 474-110.000.

Tsuchiya, Makoto: *See*—
Futamura, Hideyuki; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,073,616, Cl. 526-264.000.

Tsuchiya, Takao: *See*—
Shirakura, Akira; Tsuchiya, Takao; Watanabe, Haruo; and Kawasumi, Koichi, 5,073,798, Cl. 355-245.000.

Tsuchiya, Tomonobu: *See*—
Uomi, Kazuhisa; Ohtoshi, Tsukuru; Tsuchiya, Tomonobu; Sasaki, Shinji; and Chinone, Naoki, 5,073,892, Cl. 372-45.000.

Tsunoda, Yoshito: *See*—
Maeda, Takeshi; and Tsunoda, Yoshito, 5,073,880, Cl. 369-32.000.

Tsutsumi, Naoyuki: *See*—
Kamijo, Tetsuhide; Ujiie, Arao; Tsutsumi, Naoyuki; and Tsubaki, Atsushi, 5,073,553, Cl. 514-232.800.

Tsuyama, Toshiaki: *See*—
Kawamura, Makoto; Okazaki, Haruki; Kageyama, Fumio; Nobumoto, Kazutoshi; and Tsuyama, Toshiaki, 5,072,995, Cl. 303-100.000.

Tu, Chen-Pei D.: *See*—
Helmer, Georgia; Duesing, John; Rothstein, Steven; Scarafia, Liliana; Chilton, Mary-Dell; Lai, Hui-Chen J.; and Tu, Chen-Pei D., 5,073,677, Cl. 800-205.000.

Tucker Housewares: *See*—
Evans, David L., 5,072,576, Cl. 53-592.000.

Tucker, Robert C., Jr.: *See*—
Taylor, Thomas A.; and Tucker, Robert C., Jr., 5,073,415, Cl. 427-433.000.

Tunemoto, Daiei: *See*—
Kobori, Takeo; and Tunemoto, Daiei, 5,073,551, Cl. 514-206.000.

Tungsram Reszvenytarsasag: *See*—
Busai, Gyula; Vegh, Gyorgyi; Losonczi, Zoltan; Ocsovai, Akos; Pozsonyi, Istvan; Szabo, Gyorgy; and Vajo, Gyorgy, 5,073,742, Cl. 313-318.000.

Turner, Deborah J.; Mehta, Arvind M.; Foley, Jeanne M.; and Doughty, Darrell G., to Richardson-Vicks, Inc. Leave-on facial emulsion compositions. 5,073,371, Cl. 424-401.000.

Turner, Deborah J.; Mehta, Arvind M.; Foley, Jeanne M.; and Doughty, Darrell G., to Richardson-Vicks, Inc. Leave-on facial emulsion compositions. 5,073,372, Cl. 424-401.000.

Tuthill Corporation: *See*—
O'Connell, Timothy B., 5,073,038, Cl. 384-206.000.

Tuttle, Mark E.: *See*—
Doan, Trung; Tuttle, Mark E.; and Lowrey, Tyler A., 5,073,518, Cl. 437-180.000.

Tymco, Inc.: *See*—
Young, Gary B.; Hanel, Albert L.; and Veselka, Kenneth R., 5,072,485, Cl. 15-346.000.

Tzei, Chen Y.: *See*—
Tai, Wu D.; Tzei, Chen Y.; and Jang, Shiau R., 5,072,986, Cl. 296-97.220.

Ube Industries Limited: *See*—
Iwata, Masayuki; Kimura, Tomio; Inoue, Teruhiko; Fujihara, Yoshimi; and Katsube, Tetsushi, 5,073,556, Cl. 514-254.000.
Obata, Tokio; Fujii, Katsutoshi; Narita, Isamu; and Shikita, Shoji, 5,073,558, Cl. 514-259.000.

Uchida, Nobuo; Oinaga, Yuji; and Itoh, Mikio, to Fujitsu Limited. Main storage access priority control system that checks bus conflict condition and logical storage busy condition at different clock cycles. 5,073,871, Cl. 395-425.000.

Uchida, Satoshi: *See*—
Takeda, Masahiro; and Uchida, Satoshi, 5,073,949, Cl. 382-2.000.

Uchida, Takeyuki: *See*—
Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.

Uchiyama, Goro . Multi-use type heating apparatus. 5,073,697, Cl. 219-385.000.

Udseth, Harold R.: *See*—
Smith, Richard D.; Udseth, Harold R.; and Rockwood, Alan L., 5,073,713, Cl. 250-282.000.

Ueda, Atsushi: *See*—
Sato, Seiichi; Kurosawa, Yoshi; Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.

Ueda, Katsunori: *See*—
Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,073,865, Cl. 364-431.050.

Ueda, Koichi: *See*—
Kusuda, Hidefumi; Konishi, Katsuji; and Ueda, Koichi, 5,073,477, Cl. 430-287.000.

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Inoue, Takayuki; Nishida, Kouji; Saito, Keiichi; Nakamori, Kazunobu; Uematsu, Takefumi; and Uchida, Takeyuki, 5,073,596, Cl. 525-92.000.

Uemura, Hisashi: *See*—
Shimada, Fumihiro; and Uemura, Hisashi, 5,073,786, Cl. 346-76.0PH.

Uemura, Toshiya: *See*—
Ito, Toshiyasu; Mori, Takaaki; Kato, Mamoru; and Uemura, Toshiya, 5,073,011, Cl. 359-265.000.

Ueno, Ryuji: *See*—
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Sasaki, Noboru; and Ueyama, Masayuki, 5,072,521, Cl. 29-879.000.

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Gugel, Bernd; and Ullrich, Matthias, 5,073,051, Cl. 400-124.000.

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Willaredt, Rodney M., 5,073,768, Cl. 340-475.000.

Umemura, Hiroyuki: *See*—
Aoki, Katsuyuki; Nagatomo, Hideaki; Kubo, Seiji; Umemura, Hiroyuki; Tanaka, Toshihiro; Isono, Kazuaki; and Ishioka, Hidenori, 5,072,878, Cl. 236-38.000.

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Un, Chong S.: *See*—
Methvin, David H.; and Un, Chong S., 5,073,864, Cl. 364-715.110.

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Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,073,517, Cl. 437-153.000.

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Boodaghains, Razmik B. Z.; Fuller, Colin G.; and Meredith, Aloysius G., 5,073,578, Cl. 523-201.000.

Union Camp Corporation: *See*—
Nguyen, Dong D., 5,073,714, Cl. 250-341.000.
Veazey, Richard L.; and Bardasz, Ewa A., 5,073,300, Cl. 252-392.000.

Union Carbide Chemicals and Plastics Company, Inc.: *See*—
Chafin, Richard B.; and Warren, Barbara K., 5,073,656, Cl. 585-500.000.
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Taylor, Thomas A.; and Tucker, Robert C., Jr., 5,073,415, Cl. 427-433.000.

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Gallup, Darrell L.; and Jost, John W., 5,073,270, Cl. 210-698.000.
Ingle, David M., 5,073,445, Cl. 428-314.400.
Miller, Alex E., 5,073,388, Cl. 426-74.000.

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Schmitt, Larry D.; and Bailey, David W., 5,073,225, Cl. 156-401.000.

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Agriculture: *See*—
Weaver, Barry A.; and Whitt, Douglas E., 5,072,981, Cl. 294-102.100.
Air Force: *See*—
Hayman, Lowell K., 5,072,554, Cl. 52-79.100.
Horner, Joseph L.; and Makekau, Charles K., 5,073,006, Cl. 359-561.000.
Army: *See*—
Barley, Thomas A.; Alexander, Pierre M.; and Rast, Gustaf J., Jr., 5,073,780, Cl. 342-45.000.
Paolella, Arthur, 5,073,718, Cl. 250-551.000.
Pistor, Helmut H.; and Brown, James C., 5,073,022, Cl. 352-223.000.
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Sturzebecher, Dana J.; and Paolella, Arthur, 5,073,717, Cl. 250-551.000.
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—Weiss, Jonathan D., 5,072,617, Cl. 73-299.000.
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Anderson, Iver E.; and Ayers, Jack D., 5,073,409, Cl. 427-217.000.
Brininstool, Michael R.; Newmaster, Jeffrey T.; and Garrett, Steven L., 5,073,711, Cl. 250-231.180.
Brown, Gair D., 5,073,720, Cl. 250-577.000.
Westfall, Wallace D., 5,073,784, Cl. 342-465.000.

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Bockelmann, Gerhard-Jurgen, 5,073,732, Cl. 307-540.000.
Collier, Christopher J.; and Murray, Robert J., 5,073,899, Cl. 375-1.000.
Imme, Martin W., 5,073,958, Cl. 382-22.000.
Johnson, Nigel L., 5,073,853, Cl. 395-575.000.
Magne, Francois; and Chelouche, Marc, 5,073,903, Cl. 375-45.000.
Richards, Anthony H., 5,073,760, Cl. 330-252.000.
Van Endschot, Johannes G.; and Van Doorn, Cornelis M., 5,073,917, Cl. 378-197.000.
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—Amelio, Armand F., 5,072,898, Cl. 244-129.400.
—Dressler, Jeffrey T.; Beytes, Deane A.; and Eichhorn, Gunther, 5,072,785, Cl. 165-47.000.
—Goodman, Robert B., 5,072,781, Cl. 165-40.000.
—Kromrey, Robert V., 5,073,443, Cl. 428-313.700.
—Nalette, Timothy A.; and Steele, John W., 5,073,505, Cl. 436-178.000.
—Patterson, Gregory S.; and Kelly, James B., 5,072,580, Cl. 60-242.000.
—Steele, John W., 5,073,502, Cl. 436-125.000.

University of Akron: *See*—
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University of Arkansas, The: *See*—
Sheng, Zhengzhi; and Herman, Allen M., 5,073,536, Cl. 505-1.000.

University of British Columbia, The: *See*—
Chaklader, Asoke C. D.; Butters, Robert G.; and Ross, Douglas A., 5,073,193, Cl. 75-346.000.

University of California, The Regents of the: *See*—
Blanch, Harvey W.; and Yin, John, 5,073,575, Cl. 521-33.000.

University of Colorado Foundation, Inc.: *See*—
Johnson, Kristina M.; Mao, Chongchang; and Abdulhalim, Ibrahim S., 5,073,010, Cl. 359-72.000.

University of Minnesota, Regents of the: *See*—
Dorman, Frank D.; and Wigness, Bruce D., 5,073,094, Cl. 417-412.000.

University of Missouri, The Curators of the: *See*—
Collier, Harvest L.; Bertrand, Gary L.; and Venable, Raymond L., 5,073,289, Cl. 252-162.000.

University of Petroleum, China: *See*—
Shen, Zhonghou; Xu, Yiji; and Wang, DeXin, 5,072,796, Cl. 175-340.000.

University of Pittsburgh of the Commonwealth System of Higher Education: *See*—
Mazloomdoost, Manoochehr; and Foon, Wilfred L., 5,072,726, Cl. 128-200.140.

University of Washington, The Board of Regents of the: *See*—
Foster, Donald C.; and Davie, Earl W., 5,073,609, Cl. 536-27.000.

Uomi, Kazuhisa; Ohtoshi, Tsukuru; Tsuchiya, Tomonobu; Sasaki, Shinji; and Chinone, Naoki, to Hitachi, Ltd. Semiconductor laser device. 5,073,892, Cl. 372-45.000.

UOP: *See*—
—Arena, Blaise J.; and Kurek, Paul R., 5,073,654, Cl. 585-467.000.
—Forte, Paulino, 5,073,669, Cl. 585-808.000.

Urban, Ernst-Gunther; and Knoll, Heiko-Christian, to Jagenberg Aktiengesellschaft. Apparatus for positioning devices for operating upon sheets or webs. 5,072,641, Cl. 83-499.000.

Urushihara, Tomonori; Yokoyama, Junichi; and Itoh, Teruyuki, to Nisson Motor Company, Ltd. Exhaust system for internal combustion engines. 5,072,583, Cl. 60-313.000.

Ushimaru, Akira: *See*—
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Uskokovic, Milan R.: *See*—
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Usui Kikusai Sangyo Kaisha Ltd.: *See*—
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Usui Kokusai Sangyo Kaisha Ltd.: *See*—
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Matsuhashi, Tyoku; Usui, Mitsuko; Mitsuhashi, Masakazu; and Ando, Shunsaku, 5,073,628, Cl. 530-379.000.

Usui, Tadashi; and Kagoshige, Shinji, to Showa Aluminum Corporation. Heat exchanger made of aluminum. 5,072,789, Cl. 165-134.100.

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Satoh, Katsuaki; Sato, Kazue; Murata, Kousaku; Tanaka, Tsuneo; Saiki, Shuji; Takayama, Satoshi; Takewa, Hiroyuki; Serikawa, Mitsuhiko; Ishikawa, Seiichi; Usuki, Sawako; Kimura, Yoichi; and Obata, Shuichi, 5,073,946, Cl. 381-154.000.

Utica Enterprises, Inc.: *See*—
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Vajo, Gyorgy: *See*—
Busai, Gyula; Vegh, Gyorgyi; Losonczi, Zoltan; Ocsovai, Akos; Pozsonyi, Istvan; Szabo, Gyorgy; and Vajo, Gyorgy, 5,073,742, Cl. 313-318.000.

Valdes, Nancy: *See*—
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Valentine, A. H. Llynn; and Noack, William L., to Devon Industries, Inc. Multipurpose shaped pitcher and surgical kit and wrap system. 5,072,832, Cl. 206-570.000.

Valentine Enterprises, Inc.: *See*—
Valentine, William; and Valentine, William K., 5,073,384, Cl. 424-474.000.

Valentine, William; and Valentine, William K., to Valentine Enterprises, Inc. Maltodextrin/defoaming composition combinate. 5,073,384, Cl. 424-474.000.

Valentine, William K.: *See*—
Valentine, William; and Valentine, William K., 5,073,384, Cl. 424-474.000.

Valette, Serge; and Renard, Stephane, to Commissariat a l'Energie Atomique. Integrated optical device for measuring the refractive index of a fluid. 5,073,024, Cl. 356-345.000.

Valkama, Utria. Microphone arrangement for stringed instruments, particularly for an electric guitar. 5,072,646, Cl. 84-726.000.

Vallabhaneni, Rao V.: *See—*
Farooq, Shaji; Natarajan, Govindarajan; Reddy, Srinivasa S. N.; Shelleman, Richard A.; Stoffel, Nancy C.; and Vallabhaneni, Rao V., 5,073,180, Cl. 65-18.400.

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van Bonn, Rolf: *See—*
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Van Damme, Henri: *See—*
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van de Pas, Johannes C.: *See—*
Liberati, Patricia; McCown, Jack T.; Aronson, Michael; and van de Pas, Johannes C., 5,073,285, Cl. 252-94.000.

Van der Eycken, Erik V.: *See—*
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Van der Have, Philippe: *See—*
Larue, Jean-Pierre; Marie, Bruno; Marot, Christine; Ougarane, Lahcen; and Van der Have, Philippe, 5,073,897, Cl. 372-59.000.

Vandersteen, Richard J. Midrange loudspeaker driver. 5,073,948, Cl. 381-192.000.

Van Doorn, Cornelis M.: *See—*
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Van Endschot, Johannes G.; and Van Doorn, Cornelis M., to U.S. Philips Corporation. X-ray examination apparatus. 5,073,917, Cl. 378-197.000.

Van Fulpen, Lisa, to Kellogg Company. Carton including detachable coupon. 5,072,877, Cl. 229-155.000.

Van Niekerk, Gerhard A., to Climbminster Limited. Integrally molded sweeping implement. 5,072,479, Cl. 15-111.000.

VanRens, Russell J.: *See—*
Schmidt, Rick A.; Smith, LaVerne D.; and VanRens, Russell J., 5,073,100, Cl. 425-192.00R.

Van Soest, Hendrikus J. J., to Oce Nederland B.V. Device for conveying and positioning sheets. 5,072,926, Cl. 271-236.000.

Van Steenbrugge, Bernard; and Berkhoff, Egbertus J., to U.S. Philips Corp. Method of establishing a signal path between at least two apparatuses and an arrangement of at least two apparatuses for realising the method. 5,073,773, Cl. 340-825.030.

Van Steenburgh, Leon R., Jr. Refrigerant reclaim method and apparatus. 5,072,593, Cl. 62-77.000.

Van Streader, Gary: *See—*
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VanTassel, James. Building panels and method thereof. 5,072,569, Cl. 52-745.000.

Van Tyne, Richard G.; Neff, Marion W.; and Mondie, George R., to ElectroCom Automation, Inc. Bar code location and recognition processing system. 5,073,954, Cl. 382-18.000.

Vargas, Greg: *See—*
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Vargus Ltd.: *See—*
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Vari-Lite, Inc.: *See—*
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Varitech Industries, Inc.: *See—*
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Vasilow, Theodore R.; and Zymboly, Gregory E., to Westinghouse Electric Corp. Applying a tapered electrode on a porous ceramic support tube by masking a band inside the tube and drawing in electrode material from the outside of the tube by suction. 5,073,405, Cl. 427-105.000.

Vassiliou, Eustathios. Simulated uncooked egg with shaped egg-yolk and method of making. 5,073,399, Cl. 426-614.000.

Vayssie, Charles; Bauer, Daniel; Richard, Francoise; and Junino, Alex, to L'Oreal. Dyeing process employing indole dyes and oxidation dye precursors and dyeing agents employed. 5,073,174, Cl. 8-406.000.

Veazey, Richard L.; and Bardasz, Ewa A., to Union Camp Corporation. Corrosion inhibitors. 5,073,300, Cl. 252-392.000.

Vees, Edward C.: *See—*
Birch, Norman R.; Dunbar, James G.; Kerlin, Harold W.; Sheesley, Wilmer L.; and Vees, Edward C., 5,073,123, Cl. 439-188.000.

Vegh, Gyorgyi: *See—*
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Vehar, Gordon A.: *See—*
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Velazquez, Luis A.: *See—*
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Velezis, George A. Magazine catch assembly. 5,072,537, Cl. 42-18.000.

Venable, Raymond L.: *See—*
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Vensko, George; Lieu, Khuong B.; Meloche, Steven A.; and Potter, John C., to ITT Corporation. Dynamic time warping (DTW) apparatus for use in speech recognition systems. 5,073,939, Cl. 381-43.000.

Ventures Unlimted Inc.: *See—*
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Vermeulen, Jean: *See—*
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Verstappen Declercq, Anne E. L. M. M.: *See—*
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Vertin, Gregory D. Remote control and camera combination. 5,073,824, Cl. 358-210.000.

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Vickers, Incorporated: *See—*
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Vidusek, Daniel A., to Spraying Systems Co. Full cone spray nozzle with external air atomization. 5,072,883, Cl. 239-290.000.

Viebach, Thomas, to Dornier Medizintechtik GmbH. Coupling structure for lithotripter. 5,072,723, Cl. 128-24.0EL.

Vieira, Eric; and Laver, Hugh S., to Ciba-Geigy Corporation. Recording materials for ink-jet printing. 5,073,448, Cl. 428-331.000.

Vilain, Pascal: *See—*
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Villalon, Claudine, to U.S. Philips Corporation. Method of manufacturing an integrated semiconductor circuit including a bipolar heterojunction transistor and/or buried resistors. 5,073,508, Cl. 437-31.000.

Viltard, Jean-Charles: *See—*
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Vinarub, Edmond I.: *See—*
Krohn, David A.; and Vinarub, Edmond I., 5,073,027, Cl. 356-373.000.

Vincenzo, Cariati, to FAR S.n.c. di Generali Giacomo. Device for restoring lost fluid pressure particularly in riveting machines. 5,072,501, Cl. 29-243.525.

Viola, Jeffrey P.; and Sergi, Joseph B., to General Electric Company. Apparatus for connecting multiple passive stars in a fiber optic network. 5,073,982, Cl. 359-120.000.

Virey, Franck; and Goumy, Daniel, to L'Air Liquide, Societe Anonyme pour l'Etudeet l'Exploitation des Procedes Georges Claude. Process for manufacturing glass objects including spraying a cryogen onto the glass surface. 5,073,182, Cl. 65-84.000.

Vodrazka, Wolfgang: *See—*
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Voest-Alpine Industrieanlagenbau G.m.b.H.: *See—*
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Voest-Alpine Zeltweg Gesellschaft m.b.H.: *See—*
Brandl, Erich; Koch, Wolfgang; and Zitz, Alfred, 5,072,994, Cl. 299-67.000.

Vogt, Philippe. Tripod head. 5,072,907, Cl. 248-181.000.

Vogt, Thomas C., Jr.; and Obluda, Gerard R., to Mobil Oil Corporation. Acceleration of hydrocarbon gas production from coal beds. 5,072,990, Cl. 299-4.000.

Voisin, Paul: *See—*
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Vomhoff, Erich: *See—*
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von dem Hagen, Tronje: *See—*
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Voss, Karl D.: *See—*
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W. C. Bradley Company: *See—*
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W. R. Grace & Co.-Conn.: *See—*
Enloe, Jack H.; Lau, John W.; and Rice, Roy W., 5,073,526, Cl. 501-96.000.
Kreh, Robert P., 5,073,339, Cl. 422-15.000.

Waaka, Ivor: *See—*
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Wachter, Willliam J., to Electric Power Research Institute, Inc. Anti-vibration support of U-bend flow tubes in a nuclear steam generator. 5,072,786, Cl. 165-69.000.

Wada, Shunichi; and Ohtagaki, Shigeki, to Mitsubishi Denki K.K. Suspension control device. 5,072,965, Cl. 280-707.000.

Wagener, Keit: *See—*
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Wagner, Richard N.; and Ebert, George W. Vertical blind cleaning machine. 5,072,478, Cl. 15-102.000.

Wagner, Robert. Apparatus for removing a cover from and applying a cover to a top roll mandrel. 5,072,500, Cl. 29-234.000.

Wagner, Wolfgang: *See—*
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Wai, Ma H.: *See—*
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Waitts, Robert R.; and St. Thomas, Jeffrey P., to Crown Roll Leaf, Inc. Apparatus and process of making magnetically readable cards. 5,073,221, Cl. 156-253.000.

Wakagi, Masatoshi: *See—*
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Wakai, Kunio: *See—*
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Wakai, Toshio: *See—*
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Wakefield, Elwyn P. M.; and Walker, Christopher P. H., to Inmos Limited. Packaging semiconductor chips. 5,073,816, Cl. 357-74.000.

Walker, Christopher P. H.: *See—*
Wakefield, Elwyn P. M.; and Walker, Christopher P. H., 5,073,816, Cl. 357-74.000.

Walker, David K.: *See—*
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Walker, John R.: *See—*
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Wallach, Donald F. H., to Micro Vesicular Systems, Inc. Method of using a biodegradable superabsorbing sponge. 5,073,202, Cl. 134-6.000.

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Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, to Boehringer Ingelheim KG. 1-(benzyl or pyridylmethyl)-4 or 5-aminomethyl-pyrrolidin-2-ones. 5,073,671, Cl. 548-348.000.

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Weiler, Herbert; Buchbauer, Peter; and Hofsaess, Siegfried, to Dornier Medizintechnik. Patient rest for lithotripter. 5,072,721, Cl. 128-24.0EL.

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—Bellows, James C., 5,073,499, Cl. 436-50.000.
—Fox, David A., 5,073,724, Cl. 307-360.000.
—Frohlich, Richard L., 5,073,212, Cl. 148-152.000.
—Harrison, Matthew S.; and Obley, Alan L., 5,073,087, Cl. 416-219.00R.
—Jarabak, Andrew J.; Sunderman, Wallace H.; and Mendola, Edward G., 5,072,516, Cl. 29-609.000.
—Murphy, John H.; and Jeeves, Terry A., 5,073,867, Cl. 395-27.000.
—Vasilow, Theodore R.; and Zymboly, Gregory E., 5,073,405, Cl. 427-105.000.
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Westvaco Corporation: *See*—
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Weyl, Helmut, to Robert Bosch GmbH. Measuring sensor of oxygen content of hot gas with specially shaped protective tube. 5,073,247, Cl. 204-428.000.
Wheeler, John H., to Texacone Company. Method of making polymer seals. 5,073,321, Cl. 264-102.000.
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Anderson, Edward A.; Sandi, Ernesto S.; and White, Mary K., 5,073,683, Cl. 174-117.0FF.
White, Ray D. Artificial nipple construction. 5,072,842, Cl. 215-11.400.
White, William C.: *See*—
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Wilkendorf, Werner, to HYDAC Filtertechnik GmbH. Switchover device. 5,073,260, Cl. 210-238.000.
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Wilson, David P.; Shankland, Ian R.; and Lund, Earl A. E., to Allied-Signal Inc. Method of cleaning using azeotrope-like compositions of 1,1-dichloro-1-fluoroethane, methanol and nitromethane. 5,073,206, Cl. 134-40.000.
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Wirth, Hermann O.; and Muller, Klaus, to Ciba-Geigy Corporation. Lubricants containing ammonium salts of methylphosphonic acid. 5,073,277, Cl. 252-32.70R.
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Wu, Hans. Cushion device for a sun visor used on an automobile window. 5,072,769, Cl. 160-370.200.

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Yamada, Katsuhiko; Hatanaka, Katsunori; Saika, Toshihiro; and Ishii, Takayuki, to Canon Kabushiki Kaisha. Photoelectric conversion device. 5,073,828, Cl. 358-482.000.

Yamada, Masayuki; Ichikawa, Hiroaki; Morimoto, Tadashi; Naito, Yasuyuki; Takagi, Hiroshi; Mandai, Harufumi; and Sakabe, Yukio, to Murata Mfg. Co. Dielectric ceramic composition. 5,073,523, Cl. 501-32.000.

Yamada, Michihiro; and Miyamoto, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Method of and apparatus for reducing current of semiconductor memory device. 5,073,874, Cl. 365-226.000.

Yamada, Mikio: *See*—
Nakahara, Akihiro; Yamada, Mikio; Ebisuno, Tadahiro; Sasaki, Takashi; and Oka, Kengo, 5,072,944, Cl. 273-220.000.

Yamada, Sohei; and Orihashi, Hatsuo, to Kabushiki Kaisha Kosmek. Roller conveyor device and scraper for roller. 5,072,819, Cl. 193-35.00R.

Yamada, Yoko: *See*—
Nohira, Hiroyuki; Kamei, Masanao; Kanazawa, Hideki; Yamada, Yoko; and Etoh, Yuko, 5,073,306, Cl. 252-299.610.

Yamada, Yukio; Furukawa, Akio; and Isono, Kazuki, to Sony Corporation. Video light apparatus turned-on selectively in a standby-mode of a video camera. 5,073,823, Cl. 358-209.000.

Yamagata, Shinji: *See*—
Takahashi, Mitsugu; Kobayashi, Yoshiaki; Mitsuhashi, Takao; and Yamagata, Shinji, 5,073,764, Cl. 335-16.000.

Yamagishi, Chiaki: *See*—
Ishikawa, Fuminori; Tamahashi, Kunihiro; Onuma, Shigeharu; Wakagi, Masatoshi; Hanazono, Masanobu; Shoji, Mitsuyoshi; Nakakawaji, Takayuki; Ito, Yutaka; Komatsuzaki, Shigeki; Shimamura, Yasuo; and Yamagishi, Chiaki, 5,073,466, Cl. 430-66.000.

Yamaguchi, Hizuru: *See*—
Owada, Nobuo; Yamaguchi, Hizuru; Ozono, Sekiko; and Yasuda, Atsumi, 5,073,810, Cl. 357-34.000.

Yamaguchi, Kazuo: *See*—
Sato, Seiichi; Kurosawa, Yoshi, Yamaguchi, Kazuo; Ueda, Atsushi; and Matsumura, Masami, 5,073,001, Cl. 385-19.000.

Yamaguchi, Teruo: *See*—
Nakagawa, Mitsuo; Okoshi, Hitoshi; Shitamura, Osamu; Numata, Hiroki; Taguchi, Mituo; Yamaguchi, Teruo; Kani, Yasunobu; and Kamata, Toshio, 5,072,689, Cl. 118-419.000.

Yamaguchi, Yasuyoshi; and Matsuda, Susumu, to Tokyo Electric Co., Ltd. Electrophotographic apparatus with manual and programmable blade cleaner. 5,073,800, Cl. 355-297.000.

Yamaha Corporation: *See*—
Imagawa, Katsuhiko, 5,072,642, Cl. 84-193.000.
Isozaki, Yoshimasa; and Oba, Yasuhiko, 5,072,644, Cl. 84-609.000.

Yamaha Hatsudoki Kabushiki Kaisha, Yamaha Motor Co., Ltd.: *See*—
Taue, Jun; and Yoshida, Takeo, 5,072,882, Cl. 239-88.000.

Yamamoto, Chizuko: *See*—
Seto, Kunio; Yamamoto, Chizuko; and Watanabe, Kiyoshi, 5,073,957, Cl. 382-22.000.

Yamamoto, Masahiro: *See*—
Magara, Takuji; Iwasaki, Takeshi; Suzuki, Toshio; and Yamamoto, Masahiro, 5,073,691, Cl. 219-69.120.

Yamamoto, Mitsuyosi: *See*—
Sirai, Akira; Yamamoto, Mitsuyosi; and Kurosawa, Haruo, 5,073,128, Cl. 439-585.000.

Yamamoto, Noriyuki: *See*—
Iinuma, Tomohisa; Yamamoto, Noriyuki; and Kato, Hideki, 5,073,580, Cl. 523-442.000.

Yamamoto, Soichiro, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide reducing agent and polymerizable compound. 5,073,472, Cl. 430-138.000.

Yamamoto, Tadao; Abe, Tetsuya; Dohi, Masaaki; Hisatomi, Shinichi; Oishi, Mitsugu; Honda, Toshiro; Hayashi, Mitsuo; and Hirono, Takeo, to Casio Computer Co., Ltd.; and Casio Electronics Manufacturing Co., Ltd. Method of forming electrophotographic image. 5,073,468, Cl. 430-110.000.

Yamamoto, Tokuzo. Konjak food gelled by vegetable juice. 5,073,395, Cl. 426-573.000.

Yamamoto, Yukio: *See*—
Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, 5,072,813, Cl. 188-322.150.

Yamamura, Akira, to Nippon Ferrofluidics Corporation. Magnetic bearing device. 5,073,737, Cl. 310-90.500.

Yamamura, Shigeharu: *See*—
Hashiguchi, Osamu; Tayama, Yukiharu; and Yamamura, Shigeharu, 5,073,125, Cl. 439-310.000.

Yamasaki, Yoshio: *See*—
Fukuhara, Kohji; and Yamasaki, Yoshio, 5,073,777, Cl. 341-131.000.

Yamashina, Ikuo, to Ikuo Yamashina. Monoclonal antibody NKY13. 5,073,493, Cl. 435-240.270.

Yamashita, Youji; and Kojima, Masakatu, to Kabushiki Kaisha Toshiba. Semiconductor crystal pulling method. 5,073,229, Cl. 156-605.000.

Yamatake-Honeywell Co., Ltd.: *See*—
Hisanaga, Tetsuo, 5,072,614, Cl. 73-204.190.

Yamazaki, Hideo: *See*—
Kubota, Kazunori; and Yamazaki, Hideo, 5,072,920, Cl. 270-53.000.

Yamazaki, Shizuka: *See*—
Fujikawa, Yoshio; and Yamazaki, Shizuka, 5,073,037, Cl. 384-120.000.

Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method of shaping superconducting oxide material. 5,073,535, Cl. 505-1.000.

Yamazaki, Tadashi, to Maruhachi Mawata Co., Ltd. Process for preparing fireproof feathers. 5,073,304, Cl. 252-603.000.

Yamazaki, Yukinobu: *See*—
Gotoh, Akira; Yamazaki, Yukinobu; Kikuchi, Naoyuki; Horigome, Shinkichi; Terao, Motoyasu; Suzuki, Horoyuki; Kitoh, Makoto;

Kokaku, Yuichi; and Shimizu, Mitsuru, 5,073,243, Cl. 204-192.260.

Yanagi, Kunihiro: *See*—
Satta, Masayuki; Takanashi, Katsuya; and Yanagi, Kunihiro, 5,073,771, Cl. 340-721.000.

Yanagidani, Yuko: *See*—
Fujihira, Shinji; Yanagidani, Yuko; Tohda, Isao; and Kanbara, Shinji, 5,072,698, Cl. 123-52.0MB.

Yanagimoto, Kazuhiro; and Hijikata, Akira, to Mitsubishi Jukogyo Kabushiki Kaisha. Trunk lid structure for vehicle. 5,072,985, Cl. 296-76.000.

Yanagisawa, Ryohzou: *See*—
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Tanishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Yanmar Diesel Engine Co., Ltd.: *See*—
Horiye, Fusamaro; and Ishii, Hitoshi, 5,072,627, Cl. 74-6.000.

Yano, Katsumi; and Kambe, Shigemitsu, to Nippon Petrochemicals Company, Limited. Multi-layered blow-molded bottle. 5,073,420, Cl. 428-35.700.

Yano, Kouzaburo: *See*—
Takano, Toshihiko; Okada, Yoshio; Inoue, Yoshio; Yano, Kouzaburo; and Tokumaru, Terutaka, 5,073,725, Cl. 307-427.000.

Yano, Yojiro: *See*—
Kajiwara, Toshiro; Kobayashi, Goroku; Fukuyama, Keiji; Sano, Ko; Yano, Yojiro; and Watanabe, Keiji, 5,073,743, Cl. 313-346.00R.

Yashiki, Seiji: *See*—
Katayama, Kenji; and Yashiki, Seiji, 5,072,711, Cl. 123-486.000.

Yasuda, Atsumi: *See*—
Owada, Nobuo; Yamaguchi, Hizuru; Ozono, Sekiko; and Yasuda, Atsumi, 5,073,810, Cl. 357-34.000.

Yasuda, Nobuyuki: *See*—
Ueki, Masaaki; Yasuda, Nobuyuki; and Masuda, Toshihiko, 5,073,778, Cl. 341-131.000.

Yasuhara, Hiroshi: *See*—
Asahina, Hiroshi; and Yasuhara, Hiroshi, 5,073,914, Cl. 378-42.000.

Yeardley, John K., to Bridon PLC. Means and method for baling straw, hay and like material. 5,072,667, Cl. 100-3.000.

Yin, John: *See*—
Blanch, Harvey W.; and Yin, John, 5,073,575, Cl. 521-33.000.

Yin Yang Yo, Inc.: *See*—
Miller, Mark M., 5,072,946, Cl. 273-292.000.

Yip, Kit C., to G. E. W. Corporation Limited. Electric toaster. 5,072,662, Cl. 99-327.000.

Yissum Research Development Company of the Hebrew University of Jerusalem: *See*—
Shoshan, Shmuel; Michaeli, Dov; and Magdassi, Shlomo, 5,073,378, Cl. 424-548.000.

Ylivakeri, Matti, to Nokia-Mobira Oy. Method and circuitry for automatic control of the frequency for a radio telephone. 5,073,973, Cl. 455-76.000.

Yodice, Daniel B. Investment casting process. 5,072,770, Cl. 164-34.000.

Yokogawa Medical Systems, Limited: *See*—
Takeuchi, Yasuhito, 5,072,734, Cl. 128-660.050.

Yokoyama, Junichi: *See*—
Urushihara, Tomonori; Yokoyama, Junichi; and Itoh, Teruyuki, 5,072,583, Cl. 60-313.000.

Yokoyama, Yuuichi: *See*—
Futamura, Hideyuki; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,073,616, Cl. 526-264.000.

Yoshida, Hiroko; Serikawa, Mitsuhiko; Kawamura, Akihisa; Matsumoto, Masaharu; and Sato, Katsuaki, to Matsushita Electric Industrial Co., Ltd. Sound field control apparatus. 5,073,942, Cl. 381-61.000.

Yoshida, Hitoshi: *See*—
Kawamoto, Naoyuki; Yoshida, Hitoshi; and Kanegae, Takahiro, 5,073,956, Cl. 382-22.000.

Yoshida, Kazuetsu: *See*—
Futamoto, Masaaki; Honda, Yukio; Asada, Selichi; Nishimura, Takashi; and Yoshida, Kazuetsu, 5,073,460, Cl. 428-694.000.

Yoshida Kogyo K. K.: *See*—
Hirota, Minoru; Kuse, Kazuki; and Keyaki, Keiichi, 5,072,502, Cl. 29-408.000.

Yoshida, Masato: *See*—
Togai, Kazuhide; Danno, Yoshiaki; Yoshida, Masato; Shimada, Makoto; and Ueda, Katsunori, 5,073,865, Cl. 364-431.050.

Yoshida, Mitsuhiro; Morita, Yutaka; Ishino, Yoshio; and Ohsawa, Shigemitsu, to Sansho Co., Ltd.; and Eisai Co., Ltd. Pharmaceutical preparation for percutaneous administration containing eperisone or tolperisone or salt thereof. 5,073,375, Cl. 424-449.000.

Yoshida, Susumu, to Mitsubishi Denki Kabushiki Kaisha. Method of making a semiconductor device. 5,073,520, Cl. 437-184.000.

Yoshida, Takeo: *See*—
Taue, Jun; and Yoshida, Takeo, 5,072,882, Cl. 239-88.000.

Yoshimura, Ichiro; Matsuda, Yasuo; and Chigusa, Yoshiki, to Sumitomo Electric Industries, Ltd. Method for controlling fiber diameter during optical fiber drawing process. 5,073,179, Cl. 65-2.000.

Yoshimura, Yuichiroh: *See*—
Kobayashi, Katsuyuki; Kaneko, Kiyoshi; Yanagisawa, Ryohzou; Yoshimura, Yuichiroh; Tanaka, Atsushi; Tanishi, Shinnosuke; and Kamono, Takeshi, 5,073,685, Cl. 178-18.000.

Yoshino, Akira, to NEC Corporation. Method of manufacturing insulated gate field effect transistor having a high impurity density region beneath the channel region. 5,073,512, Cl. 437-41.000.

Yoshioka, Yuji; Yamamoto, Yukio; Ogawa, Osamu; Nakayama, Fujio; Hitani, Tomoki; and Kurosawa, Ryuichi, to Toyota Jidosha Kabushiki Kaisha. Damper. 5,072,813, Cl. 188-322.150.

Yossifor, Oded; and Brown, Sanford M., III. Secured data transmission and error recovery mechanism in cordless telephones. 5,073,932, Cl. 380-23.000.

You, Claudine: *See*—
Melec, Didier; You, Claudine; Lefere, Genevieve; and Peres, Claudine, 5,073,441, Cl. 428-254.000.

Young, Gary B.; Hanel, Albert L.; and Veselka, Kenneth R., to Tymco, Inc. Surface sweeping machine with over-the-cab hopper dumping. 5,072,485, Cl. 15-346.000.

Young, Horace J. Hand truck. 5,072,958, Cl. 280-40.000.

Yu, Hong, to CaSat Technology, Inc. Low frequency carrierband multi-port signal coupler. 5,073,762, Cl. 333-112.000.

Yurchak, Sergei: *See*—
Child, Jonathan E.; Huss, Albin, Jr.; Krambeck, Frederick J.; Ragonese, Francis P.; Thomson, Robert T.; and Yurchak, Sergei, 5,073,665, Cl. 585-722.000.

Yuugen Saisha Parasight: *See*—
Nojima, Youko; and Nojima, Hisatake, 5,073,311, Cl. 261-93.000.

Zacoi, Thomas N., to Federal Leasing Rehab Company. Apparatus for controlling the temperature of an area of the body. 5,072,875, Cl. 128-400.000.

Zaenger, Ian C.: *See*—
Sikkenga, David L.; Lamb, Joyce D.; Zaenger, Ian C.; and Williams, Gregory S., 5,073,670, Cl. 585-320.000.

Zahnradfabrik Friedrichshafen, AG: *See*—
Fassbender, Rolf; and Ilg, Bernd, 5,072,585, Cl. 60-384.000.
Fassbender, Rolf, 5,072,586, Cl. 60-384.000.
Tischer, Werner, 5,072,802, Cl. 180-132.000.

Zandstra, Lawrence D.: *See*—
Bowden, David R.; Ouwinga, Ross A.; and Zandstra, Lawrence D., 5,073,028, Cl. 356-402.000.

Zanier, Adriano; and Lendi, Jurg, to Tesa S.A. Electronic sensor for the measurement of linear magnitudes. 5,072,524, Cl. 33-558.000.

Zaoralek, Heinz-Michael; and Vomhoff, Erich, to Schwabische Huttenwerke GmbH. Glazing or calendering roll. 5,072,497, Cl. 29-123.000.

Zappia, Vincenzo; and DeRosa, Mario. Lipophilic salts of S-adenosyl-L-methionine (SAM) with acylated taurine derivatives. 5,073,546, Cl. 514-46.000.

Zarabadi, Seyed R.; Padgett, Myron G.; and Kennedy, Richard A., to Delco Electronics Corporation. Stop on station circuit including center channel detector. 5,073,975, Cl. 455-161.000.

Zarate, Rene A., to South Texas Sports Manufacturing, Inc. Baseball batting practice device. 5,072,937, Cl. 273-26.00E.

Zasloff, Michael, to Magainin Sciences Inc. CPF peptide compositions and their use in inhibiting growth of target cells or a virus. 5,073,542, Cl. 514-12.000.

Zedalis, Michael S.: *See*—
Skinner, David J.; and Zedalis, Michael S., 5,073,215, Cl. 148-415.000.

Zeiders, Jeffrey A.: *See*—
Edwards, Bryan T.; Flickinger, Steven L.; Kevern, James D.; Sonner, David D.; Weber, Robert N.; and Zeiders, Jeffrey A., 5,073,046, Cl. 385-90.000.

Zeidman, Philip A. Landscaping block. 5,072,566, Cl. 52-608.000.

Zeldis, Jerome B.; Gale, Robert P.; and Steinberg, Howard N., to Beth Israel Hospital Association. Assay to detect the presence of live virus in vitro. 5,073,481, Cl. 435-5.000.

Zemanian, Thomas S.; Gold, Thomas; Streett, William B.; and Zollweg, John A., to Cornell Research Foundation, Inc. Hydrocarbon synthesis from lower alkanes at advanced temperatures and high pressures. 5,073,666, Cl. 585-734.000.

Zhang, Cao H.; Chang, Tao L.; and De, Pan Y., to Beijing Institute of Nuclear Engineering. Densitometer for the on-line concentration measurement of rare earth metals and method. 5,073,915, Cl. 378-54.000.

Zhang, Hongmin, to APT Instruments Corp. Truth value converter. 5,073,863, Cl. 364-715.010.

Ziemek, Gerhard, to Kabelmetal Electro GmbH. Method and apapratus for forming metallic sheaths about optical conductor elements. 5,072,870, Cl. 228-102.000.

Zingale, Ron P. Golf bag carrier and method therefor. 5,072,867, Cl. 224-162.000.

Zinser, Richard L.; Koch, Steven R.; and Toy, Raymond L., to General Electric Company. Method for protecting multi-pulse coders from fading and random pattern bit errors. 5,073,940, Cl. 381-47.000.

Zip-Pak Incorporated: *See*—
Boeckmann, Hugo, 5,072,571, Cl. 53-133.400.

Zitz, Alfred: *See*—
Brandl, Erich; Koch, Wolfgang; and Zitz, Alfred, 5,072,994, Cl. 299-67.000.

Zollweg, John A.: *See*—
Zemanian, Thomas S.; Gold, Thomas; Streett, William B.; and Zollweg, John A., 5,073,666, Cl. 585-734.000.

Zweifel, Hans: *See*—
Meier, Kurt; Eugster, Giuliano; Schwarzenbach, Franz; and Zweifel, Hans, 5,073,476, Cl. 430-280.000.

Zwicker, Harry R.: *See*—
Newkirk, Marc S.; and Zwicker, Harry R., 5,073,527, Cl. 501-127.000.

Zymboly, Gregory E.: *See*—
Vasilow, Theodore R.; and Zymboly, Gregory E., 5,073,405, Cl. 427-105.000.

3M Fiber Optic Products, Inc.: *See*—
Krohn, David A.; and Vinarub, Edmond I., 5,073,027, Cl. 356-373.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF DECEMBER, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Agency of Industrial Science and Technology: *See*—
Mitome, Hideto, Re. 33,771, Cl. 367-137.000.

American Cyanamid Company: *See*—
Guerro, Gerald J.; and Borsinger, Gregory G., Re. 33,773, Cl. 428-288.000.

Berns, Antonius J. M.; and Gielkens, Arnold L. J., to Centraal Diergeneeskundig Instituut. Deletion mutant of a herpesvirus and vaccine containing said virus. Re. 33,772, Cl. 424-89.000.

Borsinger, Gregory G.: *See*—
Guerro, Gerald J.; and Borsinger, Gregory G., Re. 33,773, Cl. 428-288.000.

Centraal Diergeneeskundig Instituut: *See*—
Berns, Antonius J. M.; and Gielkens, Arnold L. J., Re. 33,772, Cl. 424-89.000.

Gielkens, Arnold L. J.: *See*—
Berns, Antonius J. M.; and Gielkens, Arnold L. J., Re. 33,772, Cl. 424-89.000.

Guerro, Gerald J.; and Borsinger, Gregory G., to American Cyanamid Company. Method of manufacturing a sag-resistant bonded particulate matter. Re. 33,773, Cl. 428-288.000.

Harrod, Lawrence R., to Kransco. Ridable vehicle and assembly method. Re. 33,769, Cl. 296-177.000.

Hitachi Metals, Ltd.: *See*—
Torino, Mitsuhiro; and Yamashita, Keitaro, Re. 33,770, Cl. 355-290.000.

Kransco: *See*—
Harrod, Lawrence R., Re. 33,769, Cl. 296-177.000.

Ministry of International Trade and Industry: *See*—
Mitome, Hideto, Re. 33,771, Cl. 367-137.000.

Mitome, Hideto, to Agency of Industrial Science and Technology; and Ministry of International Trade and Industry. Visualizing method for three dimensional standing wave sound field. Re. 33,771, Cl. 367-137.000.

Pitcairn, Ian C. Water ski construction. Re. 33,768, Cl. 441-68.000.

Torino, Mitsuhiro; and Yamashita, Keitaro, to Hitachi Metals, Ltd. Heat-fixing apparatus. Re. 33,770, Cl. 355-290.000.

Yamashita, Keitaro: *See*—
Torino, Mitsuhiro; and Yamashita, Keitaro, Re. 33,770, Cl. 355-290.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Arthrotek, Inc.: *See*—
Gay, Thomas; Bertolami, Charles N.; and Solonche, David J., B1 4,836,218, Cl. 128-773.000.

Bertolami, Charles N.: *See*—
Gay, Thomas; Bertolami, Charles N.; and Solonche, David J., B1 4,836,218, Cl. 128-773.000.

Danna, Dominick; Wheeler, Robert C.; and English, Stanley R., to Welch Allyn Inc. Connector module for video endoscope system. B1 4,539,586, 12-17-91, Cl. 358-98.000.

English, Stanley R.: *See*—
Danna, Dominick; Wheeler, Robert C.; and English, Stanley R., B1 4,539,586, Cl. 358-98.000.

Gay, Thomas; Bertolami, Charles N.; and Solonche, David J., to Arthrotek, Inc. Method and apparatus for the acoustic detection and analysis of joint disorders. B1 4,836,218, 12-17-91, Cl. 128-773.000.

Norton Company: *See*—
Yarbrough, Walter A., B1 4,867,760, Cl. 51-298.000.

Solonche, David J.: *See*—
Gay, Thomas; Bertolami, Charles N.; and Solonche, David J., B1 4,836,218, Cl. 128-773.000.

Welch Allyn Inc.: *See*—
Danna, Dominick; Wheeler, Robert C.; and English, Stanley R., B1 4,539,586, Cl. 358-98.000.

Wheeler, Robert C.: *See*—
Danna, Dominick; Wheeler, Robert C.; and English, Stanley R., B1 4,539,586, Cl. 358-98.000.

Yarbrough, Walter A., to Norton Company. Coated abrasive. B1 4,867,760, 12-17-91, Cl. 51-298.000.

LIST OF DESIGN PATENTEES

Abe, Takato: *See*—
Nakamachi, Tsuyoshi; Abe, Takato; Tsuchiya, Masahito; and Musha, Atsushi, 322,435, Cl. D14-138.000.

Abraham, William R.: *See*—
Renk, Thomas E., Jr.; and Abraham, William R., 322,433, Cl. D14-133.000.

Aikawa, Masahiro, to Seikosha Co., Ltd. Clock. 322,407, 12-17-91, Cl. D10-24.000.

Alexander, Dave. Tape dispenser. 322,461, 12-17-91, Cl. D19-69.000.

Allister Manufacturing Company, Inc.: *See*—
Ginther, John F.; Burrichter, Kim E.; Coggins, Charles P.; Guthrie, David C.; and Lucchi, Mark K., 322,386, Cl. D8-330.000.

Altamore, Nicolo; and Wahl, Gregory S., to Wahl Clipper Corporation. Curling iron barrel. 322,490, 12-17-91, Cl. D28-35.000.

Althans, Richard K.; and Greb, Francis J., to Zenith Electronics Corporation. Video cassette recorder. 322,434, 12-17-91, Cl. D14-135.000.

American Design Group, Inc.: *See*—
Blum, Marvin D., 322,368, Cl. D6-460.000.

American National Can Company: *See*—
Cochran, Donald D., 322,396, Cl. D9-375.000.

Anne Co., Ltd.: *See*—
Sakita, Hirobumi, 322,484, Cl. D24-216.000.

Arai, Takashi, to ASICS Corporation. Shoe sole. 322,355, 12-17-91, Cl. D2-320.000.

Armstrong World Industries, Inc.: *See*—
Tomlinson, John F., 322,360, Cl. D4-122.000.

ASAC Corporation: *See*—
Stafford, Ricky D., 322,499, Cl. D34-5.000.
Weiss, Alan M.; Stafford, Ricky D.; and Watson, Troy, 322,496, Cl. D34-5.000.

ASICS Corporation: *See*—
Arai, Takashi, 322,355, Cl. D2-320.000.

Auradonics, Inc.: *See*—
Ianieri, John; and Rogers, Shannon, 322,482, Cl. D24-180.000.

Austin, Barry G., to Tekonsha Engineering Company. Electronic brake controller. 322,426, 12-17-91, Cl. D13-164.000.

Bailey, Henry C., to Electro Lock, Inc. Key for an electric lock. 322,387, 12-17-91, Cl. D8-347.000.

Basics Corporation: *See—*
Holmberg, Goran I., 322,453, Cl. D18-56.000.

Beck, Wilfried. Game. 322,465, 12-17-91, Cl. D21-14.000.

Bell, Robert E., Jr. Eyeglass temple covers. 322,446, 12-17-91, Cl. D16-123.000.

Benaim, Chaloum; and Rebillard, Jean-Pierre. Game board. 322,466, 12-17-91, Cl. D21-20.000.

Bengtson, Alan D.: *See—*
Kohler, Herbert V., Jr.; Bengtson, Alan D.; Gaffney, Thomas E.; and Reid, Mary J., 322,472, Cl. D23-255.000.

Bennett, Douglas L. Toe protector insert. 322,353, 12-17-91, Cl. D2-277.000.

Berger, Judith M.; and Berger, Michael R. Child's stuffed bear. 322,469, 12-17-91, Cl. D21-159.000.

Berger, Michael R.: *See—*
Berger, Judith M.; and Berger, Michael R., 322,469, Cl. D21-159.000.

Bernal, Ramon V. Combined sponge gauze bandage and hook engaging unit. 322,477, 12-17-91, Cl. D24-124.000.

Berriman, Richard E.: *See—*
McClelland, Donald R.; Bloyer, Donald R.; and Berriman, Richard E., 322,451, Cl. D18-55.000.

Bloyer, Donald R.: *See—*
McClelland, Donald R.; Bloyer, Donald R.; and Berriman, Richard E., 322,451, Cl. D18-55.000.

Blum, Marvin D., to American Design Group, Inc. Jewelry display stand. 322,368, 12-17-91, Cl. D6-460.000.

Bolanos, Henry: *See—*
Green, David T.; Bolanos, Henry; Young, Wayne P.; and Gerry, Stephen, 322,478, Cl. D24-145.000.

Breitling Montres S.A.: *See—*
Schneider, Ernest, 322,411, Cl. D10-39.000.

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Budzbanowski, Dennis J. Container. 322,402, 12-17-91, Cl. D9-428.000.

Burrichter, Kim E.: *See—*
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Camillieri, Edward J., to Camillieri, Edward J. Ulility/dump truck body. 322,419, 12-17-91, Cl. D12-15.000.

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Carlton International PLC: *See—*
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Castillo, Vincent S. Vehicle locator. 322,413, 12-17-91, Cl. D10-110.000.

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Cetrone, Vincent B.: *See—*
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Chiba, Taneaki; and Nobeashi, Kimio, to NEC Corporation. Arithmetric control unit for an electronic computer. 322,427, 12-17-91, Cl. D14-100.000.

Cochran, Donald D., to American National Can Company. Bottle. 322,396, 12-17-91, Cl. D9-375.000.

Code-A-Phone Corporation: *See—*
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Myoga, Maki, 322,437, Cl. D14-138.000.

Coggins, Charles P.: *See—*
Ginther, John F.; Burrichter, Kim E.; Coggins, Charles P.; Guthrie, David C.; and Lucchi, Mark K., 322,386, Cl. D8-330.000.

Colman, Wayne C. Shelf unit. 322,378, 12-17-91, Cl. D6-566.000.

Cromer, Florence D. Combined fragrance bottle and stopper. 322,399, 12-17-91, Cl. D9-384.000.

Cross, Gregory L.; and Cross, Wendell C., to Sun Company, Inc. Holder for a compass or similar article. 322,370, 12-17-91, Cl. D6-466.000.

Cross, Gregory L.; and Cross, Wendell C., to Sun Company, Inc. Strap compass case. 322,412, 12-17-91, Cl. D10-68.000.

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Edur, Olev. Side panel for a shelving unit. 322,374, 12-17-91, Cl. D6-492.000.

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El-Asir, Rabei K. Inflatable neck pillow. 322,380, 12-17-91, Cl. D6-604.000.

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Feinbloom, Richard E., to Designs for Vision, Inc. Combined telescope and mounting ring for handicapped patients. 322,447, 12-17-91, Cl. D16-132.000.

Fender, Franklin D. Soap dispenser. 322,377, 12-17-91, Cl. D6-545.000.

Field, Carl R., to Duz-Mor, Inc. Device for repairing and strengthening vehicles. 322,443, 12-17-91, Cl. D15-122.000.

Forbes, Hampton E., to Westvaco Corporation. Envelope. 322,455, 12-17-91, Cl. D19-3.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Envelope. 322,456, 12-17-91, Cl. D19-3.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Envelope. 322,457, 12-17-91, Cl. D19-3.000.

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Glendinning, Scott. Chair frame or similar article. 322,365, 12-17-91, Cl. D6-379.000.

Goodman, Sheldon H.; and Greenhut, Steven E. Hook. 322,361, 12-17-91, Cl. D6-323.000.

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Green, David T.; Bolanos, Henry; Young, Wayne P.; and Gerry, Stephen, to United States Surgical Corporation. Surgical purse string applicator. 322,478, 12-17-91, Cl. D24-145.000.

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Hewlett-Packard Company: *See—*
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Higbie, John M. Control unit for motion control system. 322,424, 12-17-91, Cl. D13-168.000.
Hinklin, Darrell W.; and White, Donald M., III, to Toro Company, The. Riding lawn mower tractor. 322,441, 12-17-91, Cl. D15-15.000.
Holmberg, Goran I., to Basics Corporation. Paper roll holder for a printer. 322,453, 12-17-91, Cl. D18-56.000.
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Hunt, Robert V. Frame for an electronic instrument. 322,449, 12-17-91, Cl. D17-20.000.
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Huynh, Tuan V. Game board. 322,467, 12-17-91, Cl. D21-34.000.
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Ito, Masafumi; Hasegawa, Shigeru; Sube, Minoru; Takashima, Katsuhiro; and Tsunoda, Keiji, to TEAC Corporation. Streaming cassette tape drive. 322,431, 12-17-91, Cl. D14-108.000.
Jacober, Jeffrey M.; and Longren, Kenneth, to SGI Inc. Canteen. 322,358, 12-17-91, Cl. D3-30.100.
Jones, Charles E. Ice pack for a cooler. 322,383, 12-17-91, Cl. D7-605.000.
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Kline, Jeffrey L.; Merino, Tristan A.; and Sabella, Edward J., to International Business Machines Corporation. Computer cover. 322,430, 12-17-91, Cl. D14-102.000.
Klok, Jan, to U.S. Philips Corporation. Support for a rechargeable electric iron. 322,495, 12-17-91, Cl. D32-73.000.
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Kohler, Herbert V., Jr.; Bengtson, Alan D.; Gaffney, Thomas E.; and Reid, Mary J., to Kohler Co. Spout. 322,472, 12-17-91, Cl. D23-255.000.
Kondo, Yuji, to Canon Kabushiki Kaisha. Combined video camera and video tape recorder. 322,448, 12-17-91, Cl. D16-202.000.
Kruger, Frederick W.; and Volpe, Leo S., to Tyco Industries, Inc. Toy figure. 322,468, 12-17-91, Cl. D21-148.000.
Kumatani, Hiroshi; Yamauchi, Satomi; and Fujimoto, Takanobu, to Mitsubishi Denki Kabushiki Kaisha. Controller for a sewing machine. 322,442, 12-17-91, Cl. D15-72.000.
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LeBlanc, Donald E. Greeting card. 322,454, 12-17-91, Cl. D19-1.000.
Lee, Shan-Hsiung. Eye-massaging device. 322,445, 12-17-91, Cl. D16-100.000.
Leeland, David F. Ladder platform. 322,485, 12-17-91, Cl. D25-68.000.
Legault, Timothy J. Welding cart. 322,501, 12-17-91, Cl. D34-24.000.
Lindsay, James R.; Meyer, Ronald A.; Garcia, Alexander, Jr.; and Waluszko, Alexander, to UVP, Inc. High intensity lamp housing. 322,488, 12-17-91, Cl. D26-45.000.
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Nomura, Keiko, to Seikosha Co., Ltd. Clock. 322,406, 12-17-91, Cl. D10-6.000.

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King, William L., 322,357, Cl. D3-76.000.

Sato, Yasuharu; and Nobeashi, Kimio, to NEC Corporation. Arithmetic control unit for an electronic computer. 322,428, 12-17-91, Cl. D14-100.000.

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170 5,073,257
172 5,073,258
232 5,073,259
238 5,073,260
242.1 5,073,261
321.68 5,073,262
321.83 5,073,263
404 5,073,264
500.23 5,073,265
519 5,073,266
634 5,073,267
638 5,073,268
698 5,073,269
5,073,270
710 5,073,271
728 5,073,272
760 5,073,273

CLASS 211

40 5,072,835
5,072,836
116 5,072,837
162 5,072,838
187 5,072,839

CLASS 212

205 5,072,840

CLASS 215

1 C 5,072,841
11.4 5,072,842
100 R 5,072,843
230 5,072,844

CLASS 219

10.491 5,073,689
69.12 5,073,690
5,073,691
86.8 5,073,692
93 5,073,693
121.7 5,073,687
5,073,694
130.31 5,073,695
212 5,073,688
233 5,073,696
385 5,073,697
405 5,073,698
433 5,073,699
448 5,073,701

CLASS 220

1.5 5,072,845
3.3 5,072,846
4.33 5,072,828
241 5,072,848
253 5,072,849
300 5,072,850
366 5,072,851
404 5,072,852
733 5,072,847

CLASS 222

1 5,072,853
5,072,854
39 5,072,855
78 5,072,856
94 5,072,857
144.5 5,072,858
148 5,072,859
383 5,072,860
481 5,072,861
496 5,072,862
523 5,072,863
600 5,072,864

CLASS 223

46 5,072,865
91 5,072,866

CLASS 224

162 5,072,867
252 5,072,868

CLASS 225

106 5,072,869

CLASS 226

176 5,072,872

CLASS 228

102 5,072,870
193 5,072,871
264 5,072,873
5,072,874

CLASS 229

40 5,072,876
155 5,072,877

CLASS 235

436 5,073,700
467 5,073,702
492 5,073,703

CLASS 236

38 5,072,878

CLASS 237

8 R 5,072,879

CLASS 239

8 5,072,881
88 5,072,882
290 5,072,883
373 5,072,884
466 5,072,885

CLASS 241

1 5,072,886
37 5,072,887
194 5,072,888

CLASS 242

35.5 R 5,072,889

CLASS 244

3.16 5,072,890
3.21 5,072,891
23 C 5,072,892
76 R 5,072,893
91 5,072,894
118.1 5,072,895
122 AF 5,072,896
122 AG 5,072,897
129.4 5,072,898
155 R 5,072,899

CLASS 246

5 5,072,900

CLASS 248

49 5,072,901
65 5,072,902
72 5,072,903
110 5,072,904
118 5,072,905
122 5,072,906
181 5,072,907
231.8 5,072,908
311.2 5,072,909
412 5,072,910

CLASS 249

61 5,072,911

CLASS 250

201.1 5,073,704
216 5,073,705
221 5,073,706
223 B 5,073,708
223 R 5,073,707
226 5,073,709
231.14 5,073,710
231.18 5,073,711
252.1 5,073,712
282 5,073,713
341 5,073,714
370.01 5,073,715
492.2 5,073,716
551 5,073,717
5,073,718
573 5,073,719
577 5,073,720

CLASS 251

63.5 5,072,912
99 5,072,913

CLASS 252

8.551 5,073,276
8.6 5,073,274
5,073,275
32.7 R 5,073,277
47 5,073,279
47.5 5,073,278
49.3 5,073,280
62 5,073,281
77 5,073,282
78.5 5,073,283
5,073,284
94 5,073,285
97 5,073,286
153 5,073,287
162 5,073,288
5,073,289
5,073,290
171 5,073,291
174.12 5,073,292
174.17 5,073,293
299.01 5,073,294
299.61 5,073,306
301.19 5,073,295
312 5,073,296
355 5,073,297
358 5,073,298
389.23 5,073,299
392 5,073,300
402 5,073,301
518 5,073,302
584 5,073,303
603 5,073,304
633 5,073,305

CLASS 254

100 5,072,914

CLASS 256

14 5,072,915

CLASS 257

68 5,072,988

CLASS 261

29 5,073,309
35 5,073,307
41.5 5,073,308
76 5,073,310
93 5,073,311
140.1 5,073,312

CLASS 264

1.1 5,073,313
1.5 5,073,314
22 5,073,316
25 5,073,315
29.1 5,073,317
46.5 5,073,318
101 5,073,319
5,073,320
102 5,073,321
103 5,073,322
118 5,073,323
245 5,073,325
255 5,073,324
278 5,073,326
290.2 5,073,327
297.2 5,073,328
297.5 5,073,329
320 5,073,237
535 5,073,330

CLASS 266

275 5,072,916

CLASS 267

162 5,072,917

CLASS 269

296 5,072,918

CLASS 270

49 5,072,919
53 5,072,920

CLASS 271

35 5,072,921
99 5,072,922
110 5,072,923
5,072,924
227 5,072,925
236 5,072,926

CLASS 272

68 5,072,927
69 5,072,928
72 5,072,929
73 5,072,930
100 5,072,931
116 5,072,932
117 5,072,933
5,072,934
119 5,072,935

CLASS 273

26 E 5,072,937
58 F 5,072,938
85 D 5,072,880
164 5,072,941
176 A 5,072,940
191 A 5,072,942
192 5,072,943
220 5,072,944
232 5,072,945
292 5,072,946
371 5,072,947
450 5,072,936

CLASS 277

2 5,072,948
3 5,072,949
9.5 5,072,950
40 5,072,951
229 5,072,952

CLASS 279

2 R 5,072,953
60 5,072,954

CLASS 280

32.5 5,072,955
33.992 5,072,956
5,072,957
40 5,072,958
47.331 5,072,959
47.34 5,072,960
278 5,072,961
414.1 5,072,962
5,072,963
457 5,072,964
707 5,072,965
730 5,072,966
732 5,072,967
806 5,072,968
808 5,072,969
811 5,072,970

CLASS 285

88 5,072,971
373 5,072,972

CLASS 292

55 5,072,973
126 5,072,974
201 5,072,975
207 5,072,976
336.3 5,072,977
359 5,072,978

CLASS 293

128 5,072,979

CLASS 294

15 5,072,980
102.1 5,072,981
103.1 5,072,982

CLASS 296

37.13 5,072,983
56 5,072,984
76 5,072,985
97.22 5,072,986
107 5,072,987
177 Re.33,769

CLASS 297

194 5,072,989

CLASS 299

4 5,072,990
9 5,072,991
33 5,072,992
37 5,072,993
67 5,072,994

CLASS 303

100 5,072,995
114 5,072,996

CLASS 307

10.1 5,073,722
10.7 5,073,721
298 5,073,723
360 5,073,724
427 5,073,725
443 5,073,726
451 5,073,727
455 5,073,728
465.1 5,073,729
480 5,073,730
482 5,073,731
540 5,073,732
590 5,073,733

CLASS 310

65 5,073,734
71 5,073,735
88 5,073,736
90.5 5,073,737
91 5,073,738
323 5,073,739
358 5,073,740

CLASS 312

35 5,072,997
204 5,072,998
249 5,072,999

CLASS 313

138 5,073,741
318 5,073,742
346 R 5,073,743

CLASS 315

8 5,073,744
307 5,073,745

CLASS 318

58.7 5,073,750
560 5,073,746
561 5,073,747
569 5,073,748
587 5,073,749

CLASS 320

1 5,073,751

CLASS 324

309 5,073,752
468 5,073,753
529 5,073,754
632 5,073,755
643 5,073,756
677 5,073,757
713 5,073,758

CLASS 330

252 5,073,760
288 5,073,759

CLASS 333

24 C 5,073,761
112 5,073,762
193 5,073,763

CLASS 335

16 5,073,764

CLASS 336

210 5,073,765
217 5,073,766

CLASS 340

311.1 5,073,767
475 5,073,768
578 5,073,769
706 5,073,770
721 5,073,771
784 5,073,772
825.03 5,073,773
825.160 5,073,774
825.79 5,073,775

CLASS 341

106 5,073,776
131 5,073,777
5,073,778

CLASS 342

37 5,073,779
45 5,073,780
51 5,073,781
179 5,073,782
359 5,073,783
465 5,073,784

CLASS 346

1.1 5,073,785
76 PH 5,073,786
135.1 5,073,787

CLASS 351

106 5,073,020
168 5,073,021

CLASS 352

223 5,073,022

CLASS 353

42 5,073,023

CLASS 354

81 5,073,788
122 5,073,789
400 5,073,790

CLASS 355

27 5,073,791
97 5,073,792
202 5,073,793
208 5,073,794
210 5,073,795
215 5,073,796
5,073,797
245 5,073,798
285 5,073,799
290 Re.33,770
297 5,073,800
311 5,073,801
313 5,073,802
324 5,073,803

CLASS 356

345 5,073,024
367 5,073,025
369 5,073,026
373 5,073,027
402 5,073,028
432 5,073,029

CLASS 357

6 5,073,804
17 5,073,805
5,073,806
24 5,073,807
30 5,073,808
5,073,809
34 5,073,810
5,073,811
5,073,812
49 5,073,813
54 5,073,814
67 5,073,815
74 5,073,816
81 5,073,817

CLASS 358

80 5,073,818
98 B1 4,539,586
107 5,073,819
133 5,073,820
5,073,821
139 5,073,822
209 5,073,823
210 5,073,824
254 5,073,825
335 5,073,826
437 5,073,827
482 5,073,828
498 5,073,829

CLASS 359

63 5,073,013
72 5,073,010
120 5,073,982
140 5,073,980
142 5,073,979
174 5,073,981
187 5,073,983
265 5,073,011
5,073,012
368 5,073,018
490 5,073,014
495 5,073,830
515 5,073,005
557 5,073,017
561 5,073,006
565 5,073,007
589 5,073,008
601 5,073,009
680 5,073,015
727 5,073,016
845 5,073,831
872 5,073,019

CLASS 360

75 5,073,832
77.04 5,073,835
77.05 5,073,833
77.08 5,073,834
113 5,073,836

CLASS 361

92 5,073,837
103 5,073,838
104 5,073,839
400 5,073,840
428 5,073,841

CLASS 362

83.2 5,073,842
84 5,073,843
156 5,073,844
226 5,073,845
263 5,073,846
293 5,073,847

CLASS 363

21 5,073,849
65 5,073,848
89 5,073,850

CLASS 364

413.1 5,073,857
413.13 5,073,858
424.05 5,073,860
424.1 5,073,859
425 5,073,854
431.05 5,073,865
436 5,073,866
550 5,073,861
551.01 5,073,862
715.01 5,073,863
715.11 5,073,864
718 5,073,869
746 5,073,870

CLASS 365

189.05 5,073,872
5,073,873
226 5,073,874

CLASS 366

25 5,073,030
144 5,073,031
168 5,073,032
343 5,073,033

CLASS 367

38 5,073,875
54 5,073,876
84 5,073,877
137 Re.33,771
5,073,878

CLASS 369

13 5,073,879
32 5,073,880
5,073,881
44.15 5,073,882
5,073,883
44.28 5,073,885
44.37 5,073,884
60 5,073,886
100 5,073,887
112 5,073,888
291 5,073,889

CLASS 370

58.2 5,073,890

CLASS 371

21.3 5,073,891

CLASS 372

26 5,073,331
45 5,073,892
5,073,893
46 5,073,894
47 5,073,895
59 5,073,896
5,073,897

CLASS 374

183 5,073,034

CLASS 375

1 5,073,898
5,073,899
5,073,900
26 5,073,901
36 5,073,902
45 5,073,903
94 5,073,904
106 5,073,905
116 5,073,906
120 5,073,907

CLASS 376

249 5,073,332
310 5,073,333
336 5,073,334
373 5,073,335
457 5,073,336

CLASS 377

62 5,073,908
72 5,073,909

CLASS 378

4 5,073,910
17 5,073,911
34 5,073,912
5,073,913
42 5,073,914
54 5,073,915
181 5,073,916
197 5,073,917
205 5,073,918

CLASS 379

29 5,073,919
30 5,073,920
53 5,073,926
5,073,927
70 5,073,928
93 5,073,929
100 5,073,921
164 5,073,922
165 5,073,923
394 5,073,924

CLASS 380

3 5,073,925
10 5,073,930
23 5,073,931
5,073,932
25 5,073,933
30 5,073,934
5,073,935

CLASS 381

26 5,073,936
34 5,073,938
43 5,073,939
47 5,073,940
5,073,941
61 5,073,942
86 5,073,943
5,073,944
89 5,073,945
154 5,073,946
187 5,073,947
188 5,073,937
192 5,073,948

CLASS 382

2 5,073,949
5,073,950
8 5,073,951
5,073,952
9 5,073,953
18 5,073,954
21 5,073,955
22 5,073,956
5,073,957
5,073,958
5,073,959
5,073,960
27 5,073,961
5,073,962
30 5,073,963
41 5,073,964
47 5,073,965
56 5,073,966

CLASS 383

19 5,073,035

CLASS 384

107 5,073,036
120 5,073,037
206 5,073,038
278 5,073,039

CLASS 385

14 5,073,000
19 5,073,001
26 5,073,040
27 5,073,004
33 5,073,003
5,073,041
49 5,073,002
69 5,073,042
81 5,073,043
86 5,073,044
90 5,073,045
5,073,046
93 5,073,047
115 5,073,048

CLASS 392

406 5,073,967

CLASS 395

27 5,073,867
112 5,073,868
375 5,073,855
5,073,856
425 5,073,851
5,073,871
500 5,073,968
575 5,073,853
700 5,073,852
725 5,073,969
800 5,073,970

CLASS 400

54 5,073,049
82 5,073,050
124 5,073,051
208 5,073,052
240.3 5,073,053
486 5,073,054
578 5,073,055

CLASS 401

202 5,073,056
206 5,073,057
260 5,073,058

CLASS 402

80 R 5,073,059

CLASS 403

405.1 5,073,060

CLASS 404

7 5,073,061
75 5,073,062
101 5,073,063

CLASS 405

259.6 5,073,064
5,073,065
279 5,073,066
302 5,073,067

CLASS 408

17 5,073,068

CLASS 409

197 5,073,069

CLASS 411

353 5,073,070
5,073,071
354 5,073,072
386 5,073,073
393 5,073,074
552 5,073,075

CLASS 412

33 5,073,076

CLASS 414

11 5,073,077
274 5,073,078
416 5,073,079
739 5,073,080
786 5,073,081

CLASS 415

72 5,073,082
115 5,073,083
209.3 5,073,084
216.1 5,073,085

CLASS 416

96 R 5,073,086
219 R 5,073,087
247 R 5,073,088

CLASS 417

68 5,073,089
102 5,073,090
383 5,073,092
410 5,073,093
412 5,073,094
417 5,073,095
454 5,073,096
571 5,073,146

CLASS 418

175 5,073,097

CLASS 420

83 5,073,337
109 5,073,338

CLASS 422

15 5,073,339
56 5,073,340
58 5,073,341
64 5,073,342
67 5,073,343
69 5,073,344
70 5,073,345
99 5,073,346
100 5,073,347
101 5,073,348
144 5,073,349
190 5,073,350
5,073,351
213 5,073,352
310 5,073,353

CLASS 423

24 5,073,354
79 5,073,355
308 5,073,357
344 5,073,358
415 A 5,073,356
594 5,073,359
608 5,073,360

CLASS 424

1.1 5,073,361
5 5,073,362
49 5,073,363
58 5,073,368
63 5,073,364
89 Re.33,772
93 5,073,367
121 5,073,369
195.1 5,073,370
401 5,073,371
5,073,372
422 5,073,373
435 5,073,374
449 5,073,375
451 5,073,376
458 5,073,377
467 5,073,379
472 5,073,380
474 5,073,384
487 5,073,381
489 5,073,365
548 5,073,378
604 5,073,382
606 5,073,383
630 5,073,385
720 5,073,366

CLASS 425

28.1 5,073,098
125 5,073,099
192 R 5,073,100
385 5,073,101
461 5,073,102
545 5,073,103

CLASS 426

7 5,073,387
74 5,073,388
103 5,073,389
113 5,073,390
231 5,073,391
5,073,392
508 5,073,393
509 5,073,394
573 5,073,395
592 5,073,396
599 5,073,397
613 5,073,398
614 5,073,399
639 5,073,400
658 5,073,401

CLASS 427

2 5,073,402
38 5,073,403
39 5,073,404
105 5,073,405
131 5,073,406
160 5,073,407
169 5,073,408
217 5,073,409
226 5,073,410
252 5,073,411
294 5,073,412
356 5,073,413
423 5,073,414
433 5,073,415

CLASS 428

2 5,073,416
31 5,073,417
34.9 5,073,418
35.4 5,073,419
35.7 5,073,420
35.8 5,073,421
40 5,073,422
42 5,073,423
43 5,073,424
48 5,073,430
56 5,073,425
64 5,073,426
67 5,073,427
71 5,073,428
102 5,073,429
116 5,073,431
134 5,073,432
195 5,073,433
215 5,073,434
219 5,073,435
220 5,073,436
224 5,073,437
5,073,438
254 5,073,440
267 5,073,441
288 Re.33,773
313.5 5,073,442
313.7 5,073,444
314.4 5,073,443
323 5,073,445
327 5,073,446
328 5,073,447
331 5,073,439
336 5,073,448
5,073,449
5,073,450
349 5,073,451
373 5,073,452
403 5,073,453
411.1 5,073,454
446 5,073,455
484 5,073,456
516 5,073,457
550 5,073,458
694 5,073,459
698 5,073,460
5,073,461

CLASS 430

14 5,073,462
28 5,073,463
30 5,073,464
58 5,073,465
66 5,073,466
87 5,073,467
110 5,073,468
5,073,469
114 5,073,470
5,073,471
138 5,073,472
247 5,073,473
270 5,073,474
278 5,073,475
280 5,073,476
287 5,073,477
317 5,073,478
569 5,073,479
623 5,073,480

CLASS 431

12 5,073,104
116 5,073,105
285 5,073,106

CLASS 432

103 5,073,107
225 5,073,108

CLASS 433

57 5,073,109
173 5,073,110
5,073,111
221 5,073,112
223 5,073,113
228.1 5,073,114

CLASS 434

297 5,073,115

CLASS 435

5 5,073,481
5,073,482
6 5,073,483
7.92 5,073,484
7.94 5,073,485
19 5,073,486
23 5,073,487
31 5,073,488
172.3 5,073,489
226 5,073,494
240.2 5,073,490
5,073,492
240.22 5,073,491
240.27 5,073,493
284 5,073,495
289 5,073,496

CLASS 436

8 5,073,497
5,073,498
50 5,073,499
53 5,073,500
74 5,073,501
125 5,073,502
147 5,073,503
174 5,073,504
178 5,073,505

CLASS 437

21 5,073,506
22 5,073,507
31 5,073,508
34 5,073,509
40 5,073,510
5,073,511
41 5,073,512
43 5,073,513
44 5,073,514
52 5,073,515
89 5,073,516
153 5,073,517
180 5,073,518
5,073,519
184 5,073,520
209 5,073,521

CLASS 439

71 5,073,116
5,073,117
5,073,118
82 5,073,119
92 5,073,120
5,073,121
134 5,073,122
188 5,073,123
197 5,073,124
310 5,073,125
452 5,073,126
473 5,073,127
585 5,073,128
5,073,129
607 5,073,130
621 5,073,131
884 5,073,132

CLASS 440

1 5,073,133
50 5,073,134

CLASS 441

6 5,073,135
7 5,073,136
68 Re.33,768

CLASS 446

61 5,073,137
103 5,073,138
242 5,073,139
297 5,073,140

CLASS 452

30 5,073,141
51 5,073,142

CLASS 454

153 5,072,657
174 5,072,659
188 5,072,658
255 5,072,656

CLASS 455

33 5,073,971
35 5,073,972
76 5,073,973
103 5,073,974
161 5,073,975
5,073,976
330 5,073,977
346 5,073,978

CLASS 464

68 5,073,143
111 5,073,144
157 5,073,145

CLASS 474

28 5,073,147
94 5,073,148
104 5,073,149
110 5,073,150
138 5,073,158
160 5,073,151
162 5,073,152
206 5,073,153
213 5,073,154
256 5,073,155

CLASS 475

56 5,073,156
211 5,073,157
216 5,073,159
281 5,073,160

CLASS 493

154 5,073,161
396 5,073,162

CLASS 501

32 5,073,523
60 5,073,524
81 5,073,525

CLASSIFICATION OF PATENTS

96 5,073,526
127 5,073,527
134 5,073,528

CLASS 502

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		322,383			322,470	19	:	322,443			322,400
		322,413	09	:	322,385	20	:	322,486			322,482
		322,417			322,478	22	:	322,439	36	:	322,389
		322,419	10	:	322,455	23	:	322,498			322,394
		322,422			322,456	25	:	322,381			322,398
		322,423			322,457			322,415			322,399
		322,424	12	:	322,377			322,440			322,447
		322,463			322,453	26	:	322,421			322,461
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		322,488			322,480			322,476	37	:	322,446
		322,492	17	:	322,396			322,487	39	:	322,361
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08	:	322,357			322,460						

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		322,437			322,475						
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		322,402	53	:	322,367						
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		322,485	55	:	322,362						
44	:	322,358			322,375						
		322,501			322,472						
45	:	322,356			322,473						

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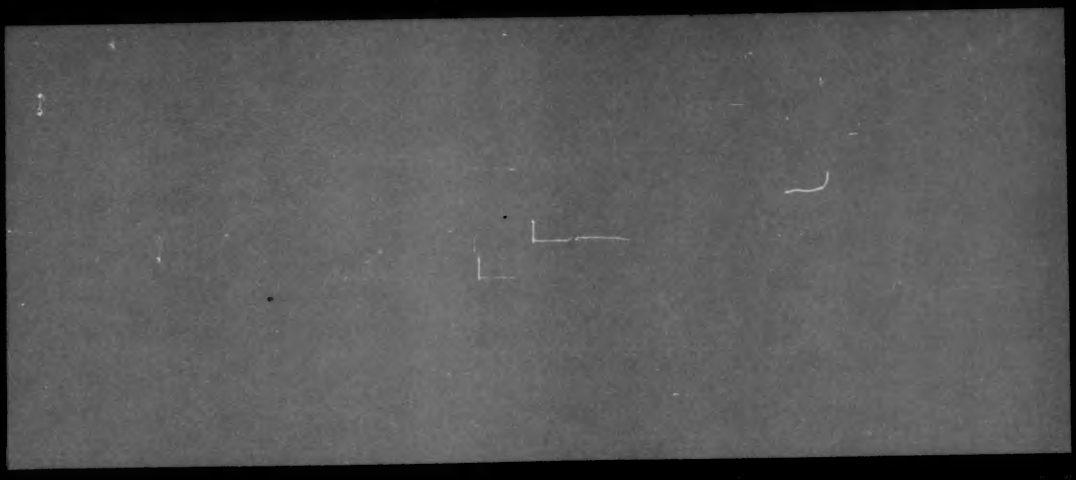

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